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ORIGINAL RESEARCH

Revision of the genus *Aristolochia* in Chile, with three new species, *A. distorta*, *A. juntucha,* and *A. marinae*

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Abstract
The taxonomy of the Chilean species of *Aristolochia* has long been a subject of debate, complicated by the broad distribution of the genus, morphological plasticity within species, and a paucity of records from several geographic areas within the country. To address these issues, we undertook a country-wide taxonomic revisionary study based on analysis of morphological variation, geographical distributions, and species ecologies. Observations were compiled in the field and herbarium. Shape analysis was performed using discriminant analysis. In the resulting taxonomic revision, we recognize six species of *Aristolochia* in Chile, including three new species, ***Aristolochia distorta***, ***A. juntucha***, and ***A. marinae***, which are here described and illustrated. A neotype is designated for *A. vaginans*, and *A. chilensis* is placed in its synonymy. *Aristolochia pearcei* is treated as distinct from *A. bridgesii* based on discriminant analysis. All six species are considered endemic to Chile. Morphological descriptions, along with discussion of geographic distributions, taxonomy, and nomenclature, as well as preliminary conservation assessments are provided for all the treated species.

Keywords Chilean Matorral · flora of Chile · floral morphometrics · Oreja de Zorro · stenoendemism.

Introduction

The genus *Aristolochia* L. consists of approximately 580 species distributed over six continents, with species diversity concentrated in the tropics and subtropics (Jiménez et al., 2021a; POWO, 2025). Within the New World, research over the past several decades has improved understanding of the biology, ecology, and distributions of the Neotropical taxa of *Aristolochia*, and has resulted in the description of various new taxa of the genus (Fernández et al., 2019; Freitas et al., 2016, 2017, 2019, 2020; Jiménez et al., 2021a, 2021b; Frank et al., 2022; Frank, 2023; González & Pabón-Mora, 2023; González et al., 2023).

Based on the morphological characteristics described by González (1991), all Chilean *Aristolochia* can be assigned as follows: *Aristolochia* subgenus *Aristolochia*, section *Gymnolobus* Duchartre, subsection *Hexandrae* (Duch.) O.C. Schmidt, series *Hexandrae* F. González, subseries *Hexandrae* (Duch.) F. González. Within subseries *Hexandrae*, the absence of pseudostipules in the leaf axils further restricts these species to the informal group referred to as 'Exstipulosae', a group comprising approximately 70 species distributed across Central and South America (Hoehne, 1942; González, 1991; González et al., 2023).

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The Chilean taxa of *Aristolochia*, all from that country, share several morphological features, including a procumbent habit and a well developed xylopodium (Saldivia & Faúndez, 2015). These taxa occur between 27°30'S and 34°31'S latitude, ranging from the Interior Mediterranean Desert Scrubland (Luebert & Pliscoff, 2006) in the northern limit of the distribution, southward into xeric shrublands and sclerophyllous forests in coastal regions, mountain ranges, and near seasonal streams in gorges and valleys (Ruiz, 2001; Saldivia & Faúndez, 2015; Ramos-González et al., 2018; GBIF Secretariat, 2023).

The taxonomy of Chilean *Aristolochia* has been controversial. In the *Flora de Chile*, Ruiz (2001) cited only *A. chilensis* Bridges ex Lindl. and *A. bridgesii* (Klotzsch) Duch. as occurring in Chile, while placing *A. pearcei* Phil. as a synonym of *A. bridgesii*. Subsequently, in the first in-depth study of the genus in Chile, Saldivia & Faúndez (2015) abandoned this synonymization and recognized three species in the country: *A. bridgesii, A. chilensis*, and *A. pearcei*. Our preliminary herbarium and field investigations suggested several unresolved taxonomic issues among the Chilean taxa, as well as the presence of possibly new taxa.

Here, we provide a comprehensive taxonomic revision of *Aristolochia* in Chile, substantiated by discriminant analysis, including the description of three new species and preliminary conservation assessments for the treated species.

Material & Methods

Taxonomic Revision. For the taxonomic revision, a total of 261 gatherings of Chilean *Aristolochia*, including all relevant types, were analyzed at the following herbaria: ASU, B, BM, CONC, E, EIF, FR, HEID, JBN, K, L, M, MA, MO, NY, RB, SDSU, SGO, SI, STU, TUB, ULS, US, VALPL, and W (acronyms follow Thiers, 2025). Morphological, phenological, distributional, and habitat data gathered from herbarium specimens were also integrated with observations made during field studies of living specimens across the distributional range of *Aristolochia* in Chile.

Length measurements of pedicels, peduncles, and ovaries, as well as length and width of the three perianth structures (limb, tube and utricle) were made on herbarium specimens and confirmed in living plants using *ImageJ* (Schneider et al., 2012). For the ratio of petiole length to peduncle plus ovary length, reported values were calculated from measurements taken on leaves and flowers of single stem nodes positioned at least three to five internodes distant from the shoot apex, with both the leaf and a late pre-anthetic to anthetic flower attached.

Following the phylogenetic species concept (PSC) (Nixon & Wheeler, 1990; Wheeler & Platnick, 2000), we recognized species as morphologically diagnosable entities with cohesive ecologies and/or geographical ranges. These pre-defined species hypotheses presented in the taxonomic revision were subsequently evaluated by Canonical Variate Analysis (CVA) of morphometric data (see below). The application of Linnean nomenclature followed the International Code of Nomenclature ICN (Turland et al., 2018). A review of relevant taxonomic literature on the genus was conducted, including the protologues of all names applicable to Chilean *Aristolochia*. The conservation status of each species was assessed using the IUCN Red List categories and criteria, with a primary focus on geographical range size and its associated subcriteria (IUCN 2012, 2013, 2024). The *Geospatial Conservation Assessment Tool* (*GeoCAT*) was used to estimate the area of occupancy (AOO) and extent of occurrence (EOO) for each species (Bachman et al., 2011). EOO was calculated as the minimum convex polygon enclosing all occurrence records, and AOO as the sum area of occupied 4 km^2 grid cells. When specimen labels yielded incompatible coordinates and locality descriptions, the latter were given priority and estimated coordinates were used.

Discriminant Analysis. To explore the morphological landscape and maximum variance between the six proposed species occurring in Chile, a total of 110 gatherings were sampled for discriminant analysis (data matrix and voucher information available in the Suppl. Material 1). The resulting data were analyzed with CVA to visualize maximum variance between the species and to identify the combinations of morphological characters that best distinguish them. Given the notoriously high degree of phenotypic plasticity in *Aristolochia*, unconstrained methods tend to emphasize traits which, while highly variable, are often not diagnostic at the species level.

We employed CVA over unconstrained multivariate methods because it more effectively resolves subtle yet taxonomically informative morphological variations. Such variation is often obscured in unconstrained ordinations, as it may be relegated to higher-order components or remain undetected (Andrus et al., 2023; De Luna-Bonilla et al., 2023; Ponce et al., 2024). The CVA tested the taxonomic hypotheses of a priori groupings, defined under the phylogenetic species concept and consistent with the morphological framework of Saldivia & Faúndez (2015). The analysis confirmed the segregation of vouchers into three recognized species—*Aristolochia bridgesii*, *A. pearcei*, and *A. vaginans*—alongside three proposed new species, each of which exhibited consistent morphological differentiation from each other and from established taxa.

Discriminant function analysis with cross-validation was used to assess the statistical significance of leaf shape differences between predefined "northern" and "southern" population groups. The groups were divided at the northernmost limit of the southernmost *A. vaginans* population. The

northern group included *A. vaginans*, *A. pearcei*, and three new species (*A. juntucha*, *A. marinae*, *A. distorta*), while the southern group contained *A. vaginan*s and *A. bridgesii*.

For discriminant analysis, mature leaves and intact flowers in late pre-anthesis stage were sampled from dried and pressed specimens (Freitas et al., 2020; Frank, 2023). The dataset comprised 363 leaves and 177 flowers. A total of five putatively homologous landmarks were chosen for each flower and six putatively homologous landmarks for each leaf (Fig. 1). For the flower, the landmarks delineated the anterior and posterior ends of the tube and limb, as well as the laterally protruding anterior part of the limb, following established protocols for *Aristolochia* (Freitas et al., 2020; Frank, 2023). The utricle was excluded from the analysis due to its susceptibility to deformation during preservation and orientation ambiguity. For the leaves, the landmarks defined the anterior and posterior ends of the main vein, the deepest point of each lateral sinus, and the anterior tip of each lateral auricle (Freitas et al., 2020, 2024; Frank, 2023).

The workflow for the morphometric analysis followed the procedure of Freitas et al. (2020). The digitization of landmarks and outlines for geometric morphometric analysis was performed using *TpsDig* version 2.31 (Rohlf, 2017), while *MorphoJ* version 1.07a (Klingenberg, 2011) was used for statistical analysis of shape variation and visualization.

Results

Discriminant Analysis. Application of PSC resulted in the sampled herbarium vouchers being assigned to six distinct groupings (here identified as distinct species) differing mainly in flower shape (Fig. 2). Of the 110 gatherings examined for discriminant analysis, 84 corresponded to *Aristolochia vaginans*, 12 to *A. pearcei*, six to *A. bridgesii*, three to *A. juntucha*, three to *A. distorta*, and two to *A. marinae* (Suppl. Material 1). The morphometric analysis comprised 206 leaves and 113 flowers of *A. vaginans*, 37 leaves and 21 flowers of *A. pearcei*, 15 leaves and six flowers of *A. bridgesii*, 49 leaves and 18 flowers of *A. juntucha*, nine leaves and seven flowers of *A. distorta*, and 47 leaves and 12 flowers of *A. marinae*.

Together, CV1 (53.3%) and CV2 (41.6%) described 94.9% of the between-group floral shape variation, based on squared canonical correlations. The canonical loadings indicate that the most diagnostic characters contributing to floral disparities are length, orientation, and

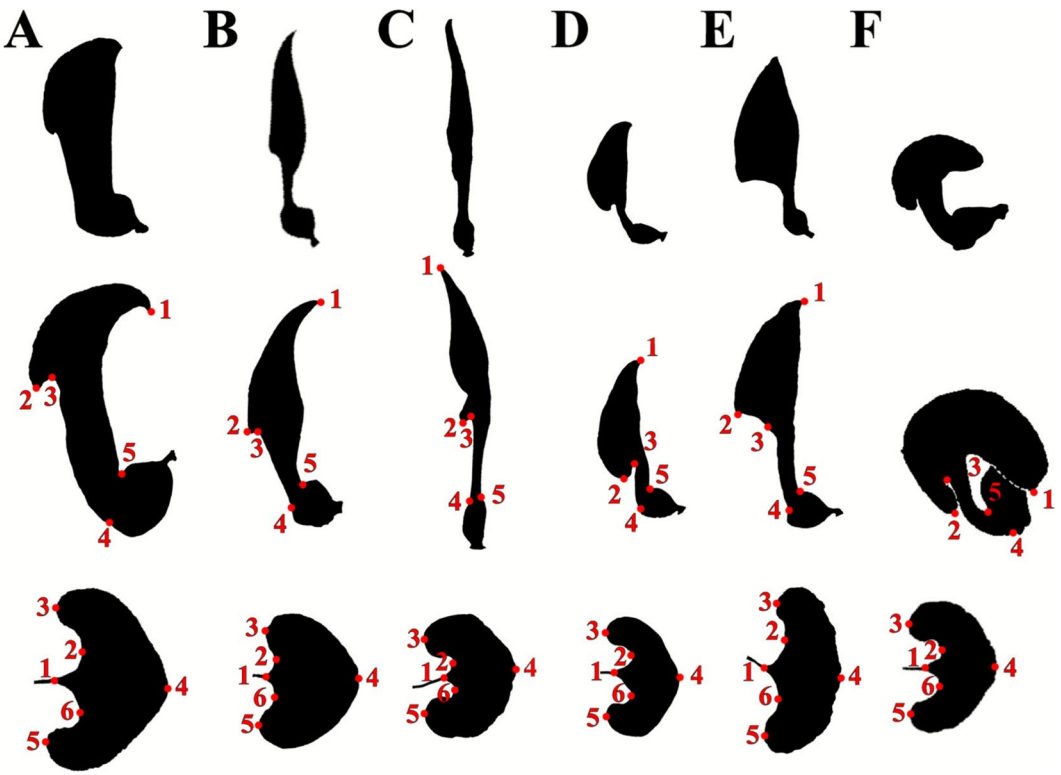

Fig. 1. Contours of representative early pre-anthetic flowers (top line), late pre-anthetic flowers (middle), and leaves (bottom) of the recognized species. **A.** *Aristolochia vaginans*. **B.** *Aristolochia pearcei*. **C.** *Aristolochia bridgesii*. **D.** *Aristolochia juntucha*. **E.** *Aristolochia marinae*. **F.** *Aristolochia distorta*. [Homologous points selected as landmarks for discriminant analysis of late pre-anthetic flowers (in lateral view) and leaves are shown in red.]

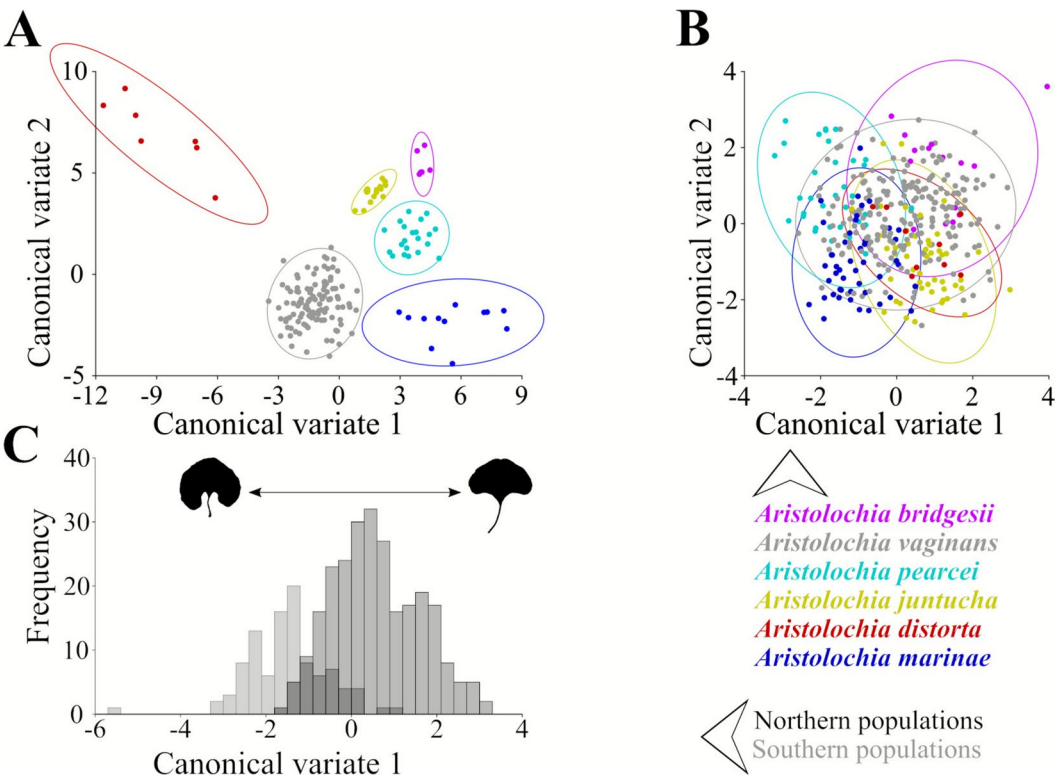

Fig. 2. Canonical Variate Analysis (CVA) of selected landmark data gathered from Chilean *Aristolochia* specimens. **A.** Flowers ($n = 177$), with the recognized species as predefined groups. **B–C.** Leaves, with species identity (B) and geographical origin (C) as the predefined groups ($n = 363$). Confidence ellipse probability = 0.96.

shape of the characteristic floral structures limb and tube (Fig. 2A). In particular, the angle between the axis connecting the proximal (landmark 2) and distal (landmark 1) ends of the limb and the long-axis of the tube (connected by landmarks 2 and 3), heretofore referred to as the limb's inclination angle, was highly diagnostic (Table 1).

As for the leaves, morphometrics tended to support the notion that leaf shape is poorly diagnostic for species identity in Chilean *Aristolochia*; no clear-cut distinction between the six taxonomic entities could be found (CV1 = 49.9%, CV2 = 39.7%; Fig. 2B). However, when leaf shapes were grouped not by species identity but by geographical origin (i.e., northern vs. southern populations; see Fig. 2C), a geographical shift in leaf shape was detected, independent of species identity. The discriminant function and cross-validation test in leaves classified by geographical origin resulted in 84% agreement with geographical attributions. The Procrustes distance among leaves from the northern and southern Chilean *Aristolochia* populations was 0.2084 ($p < 0.0001$, 10,000 permutation rounds), and the Mahalanobis Distance was 2.087 ($p < 0.0001$, 10,000 permutation rounds). This finding provides statistical support for the qualitative observation that leaf shape transitions from a reniform to hastate shape with a shallow or nearly absent sinus in the northern *Aristolochia* populations to a horseshoe-shaped, reniform appearance with a deep sinus in the southern populations (Fig. 2C).

Petiole Length to Peduncle plus Ovary Length Ratios. While the discriminant analysis did not include it, the ratio of the petiole length to the peduncle plus ovary length was less affected by environmental conditions than leaf shape, and was found to be relatively powerful for discriminating some species. For example, in *Aristolochia vaginans*, *A. bridgesii*, and *A. pearcei*, the petiole length is equal to or shorter than the peduncle plus ovary length, whereas in *A. juntucha*, *A. distorta*, and *A. marinae*, it is notably longer (Table 1; Fig. 3A).

Discussion

Diagnosing Species. The disjunct populations of *A. vaginans* and that species' partial sympatry with *A. pearcei* in the Elqui valley, Coquimbo Region, complicate the distinction of these two species and have hindered taxonomic progress on Chilean *Aristolochia*. This is indicated by the

Table 1. Morphological comparison of the Chilean *Aristolochia* species, derived from field observations and vouchered specimens.

	Aristolochia vaginans	*Aristolochia pearcei*	*Aristolochia bridgesii*	*Aristolochia distorta*	*Aristolochia juntucha*	*Aristolochia marinae*
Petiole length [cm]	0.3–4.4	0.5–3.4	0.7–2.5	2.4–8.7	2.0–7.0	1.2–3.7
Petiole surface	glabrous or hispid	puberulent	sparsely hispid	sparsely hispid	puberulent	puberulent
Leaf shape	reniform, sinus 0.9–3.5×0.5–2 cm	reniform-hastate, sinus 1–3×0.3–1 cm	reniform, sinus 0.6–1.6×0.7–1 cm	reniform, sinus 0.9–1.5×0.5–0.7 cm	reniform, sinus 0.7–1.2×0.4–0.6 cm	reniform, sinus 1.1–2.7×0.4–0.7 cm
Leaf surface—adaxial	glabrous or hispid	puberulent	glabrous	glabrous	sparsely puberulent	puberulent
Leaf surface—abaxial	glabrous or hispid	puberulent	sparsely hispid	tomentose	puberulent	puberulent
Peduncle plus ovary length [cm]	1.0–5.1	0.6–3.9	1.6–4.0	1.0–3.4	0.9–1.7	1.0–3.2
Peduncle plus ovary surface	glabrous or sparsely hispid	puberulent	glabrous	puberulent	puberulent	puberulent
Petiole/peduncle plus ovary ratio	(0.2–)0.3–0.9(–1.7)	(0.6–)0.7–1.0(–1.1)	(0.3–)0.4–0.6(–0.7)	(1.4–)1.5–2.6(–3.0)	(1.3–)1.5–2.8(–3.7)	(0.9–)1.0–1.8(–2.4)
Perianth surface	glabrous or hispid	glabrous	glabrous	glabrous	glabrous	glabrous
Utricle size [cm]	0.9–3.4×0.8–2.9	0.6–1.6×0.6–1.2	0.5–1.0×0.3–0.9	0.8–1.1×0.5–1.0	0.5–0.9×0.3–0.8	1.0–1.5×0.8–1.4
Tube size [cm]	1.6–4.5×0.8–2.5	1.2–3.3×0.2–0.6	1.1–2.1×0.2–0.5	0.9–1.5×0.3–0.6	0.7–1.6×0.3–0.6	1.6–3.1×0.4–0.8
Tube shape	cylindrical	cylindrical	cylindrical	cylindrical	cylindrical	infundibuliform
Limb size [cm]	1.8–6.0×0.8–2.4	2.5–4.1×0.8–1.3	2.8–4.0×0.4–1.0	3.0–3.2×0.8–1.2	1.7–2.7×0.6–0.9	3.0–4.5×1.4–2.4
Limb—surface (internal)	dense cover of long trichomes (absent in the northernmost populations in Atacama)	dense cover of long trichomes	glabrous, only adaxial limb zone with trichome cover	glabrous	glabrous, flat irregular warts	sparse cover of short trichomes
Limb inclination angle (landmarks 1, 2, and 3)	140–190°	75–120°	120–150°	250–280°	150–190°	80–115°
Capsule size (mature) [cm]	3.4–8.0×0.9–2.3	3.6–5.7×1.3–2.0	3.3–4.1×1.1–1.4	2.8–5.1×1.4–2.1	2.5–3.6×1.3–1.6	2.1–3.2×0.9–1.1
Seed size [mm]	4–5×3–4 mm, obovate	4–5×3–4 mm, triangular-obovate	3–4×2–3 mm, triangular-obovate	4–5×3–4 mm, triangular-obovate	4–5×3–4 mm, obovate	4–5×3–5 mm, triangular-obovate
Distribution	disjunct: Antofagasta, Atacama, N Coquimbo, Valparaiso-Metropolitana	E Coquimbo, Upper Elqui river basin	Metropolitana, O'Higgins	S Coquimbo: Estero Pupio basin	N Coquimbo: Andacollo Plateau	S Coquimbo: Río Chalinga basin

general paucity of taxonomic revisions treating Chilean *Aristolochia* and by inconsistent identifications on the abundant herbarium vouchers gathered from the country over the past 150 years (Urzúa et al., 2009; Saldivia & Faúndez, 2015).

To our knowledge, our study is the first to systematically detail the morphological landscape of Chilean *Aristolochia*. Our findings indicate that the proposed taxa do not represent a continuum of clinal variation. Rather, they form six clearly segregated species, distinguished by floral characters and further supported by other morphological distinctions and geographical distribution.

Conversely, our results demonstrate that leaf shape is highly variable and changes depending on environmental conditions (e.g., exposure, water retention, nutrient availability), from the northern to the southern to ends of the distributional area. This finding suggests that a reniform to hastate shape with a shallow or nearly absent sinus in the northern *Aristolochia* populations near the Atacama desert reflects geographic adaptation to climatic conditions with significantly more sunlight and lower precipitation relative to southern populations, where the leaves range from reniform to horseshoe-shaped with a deep sinus. We hypothesize that

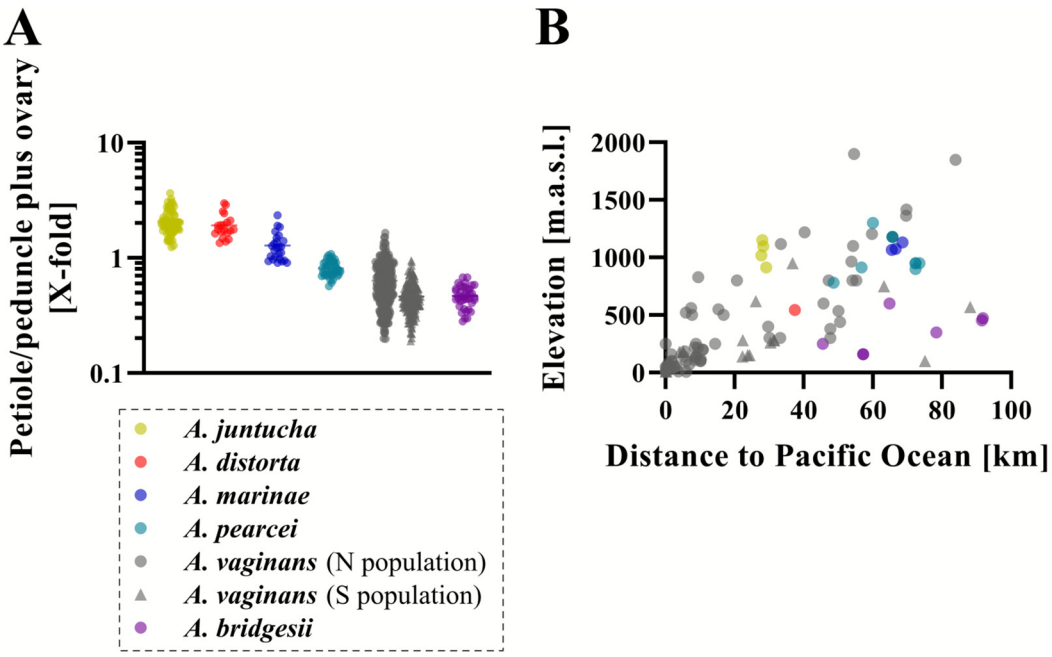

Fig. 3. **A.** Length ratios (in logarithmic scale) of petiole length to peduncle plus ovary length in Chilean *Aristolochia*. **B.** Relationship between elevation and distance to the Pacific Ocean for Chilean *Aristolochia* records.

this morphology in the northern populations reduces water loss by minimizing surface area. Notably, this feature is often accompanied by the reduction or absence of trichomes on flowers and leaves, and by the presence of a thickened cuticle on the leaves, commonly found in northern populations of *A. vaginans*.

Comparable cases, where closely related *Aristolochia* species are distinguishable by floral characters but not by leaf morphology, have been reported by previous studies (Blanco, 2002; Fernández et al., 2019; Freitas et al., 2020, 2019; Jiménez et al., 2021a, 2021b; Frank et al., 2022; Frank, 2023; González & Pabón-Mora, 2023). The diagnostic value of the ratio of petiole length to peduncle plus ovary length for distinguishing cryptic species is well demonstrated by the sympatric species *A. castellana* (Nardi) Costa and *A. paucinervis* Pomel in central Spain. Costa (2008) established that this ratio serves as a reliable diagnostic character, consistent across different environmental conditions.

Notably, while floral morphology generally supplies the best characters for distinguishing the Chilean *Aristolochia* species, earlier studies (Ruiz, 2001; Saldivia & Faúndez, 2015) noted that perianth color is a key feature that can distinguish *A. vaginans* and *A. bridgesii* (both with typically purple perianths) from *A. pearcei*, with a yellow perianth. However, our results indicate that this character is unreliable. This conclusion is supported by our field observations, which show that *A. vaginans* exhibits a range of colors from entirely purple-brown to entirely pale yellow (Fig. 4).

Biogeographical & Phylogenetic Considerations. The absence of any shared *Aristolochia* species between Chile, Argentina, Bolivia, and Peru highlights the role of the Andes as a significant biogeographic barrier, inhibiting dispersal and promoting localized diversification. The uplift of the southern Andes, estimated to have occurred between the Miocene and Pliocene (Gregory-Wodzicki, 2000), would have effectively isolated *Aristolochia* populations, with the Atacama desert forming a geographic barrier to the north, leading to allopatric speciation. This scenario aligns with diversification patterns in other Chilean plant taxa following the Andean uplift (Antonelli et al., 2009; Glade-Vargas et al., 2021; Pérez et al., 2024; García et al., 2025). The six Chilean *Aristolochia* species, which exhibit high morphological similarity, likely constitute a monophyletic group that diversified following the Andean uplift. The uplift of the Tongoy-Altos de Talinay (30.3°S and 31.3°S), in particular, may have changed the topography and local climate (Martinod et al., 2016), which could explain the disjunct distribution of *A. vaginans* and the isolated populations of *A. distorta, A. juntucha*, and *A. marinae*. The micro-endemic nature of all of the Chilean species may be attributed to a combination of limited dispersal ability, habitat specialization, and climatic constraints, characteristics frequently driving endemism in Mediterranean ecosystems (Feliner, 2014; Luebert & Weigend, 2014). We note for example that the geographical distribution of the butterfly *Battus polydamas psittacus*, which uses *Aristolochia* spp. as hostplants in Chile, mirrors the distributional pattern of *Aristolochia* almost perfectly (Urzúa et al., 2009; González-Teuber et al., 2023). From

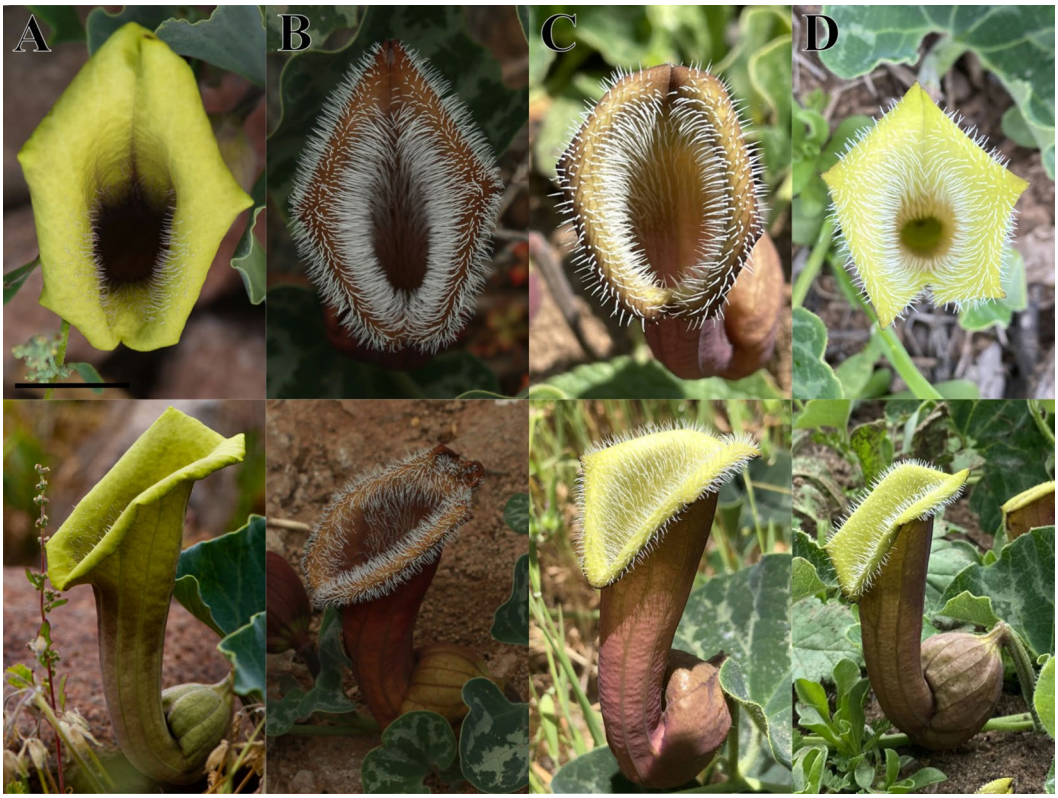

Fig. 4. Extremes in variation of anthetic flowers in frontal view (top row) and lateral view (bottom row) of *Aristolochia vaginans*. **A–B.** Northern population. **C–D.** Southern population. [Scale bar: A–D, 2.5 cm. Photos (all reproduced with permission): A, by Nicolás Felipe Villaseca Merino, near Pellejos, Atacama, unvouchered; B, by Macarena Villalobos, voucher *M. Villalobos 302*; C, by Eric Rojas, near El Quisco, Valparaíso, unvouchered; D, by Nicolás Garcés, near Petorca, Valparaíso, unvouchered].

this observation, we propose that its presence can be used as an indicator to locate *Aristolochia* populations.

Regarding the closest relatives of the Chilean *Aristolochia* species, Hoehne (1942) listed "Chile, Argentina, etc." as the distributional area of *A. vaginans*. We assume that the Argentine occurrence of *A. vaginans* represents a misidentification of material of a vegetatively similar species of the informal 'Exstipulosae' group, *A. fimbriata*. Hoehne (1942) compared *A. vaginans* with the non-Chilean species *A. argentina* Griseb. and *A. prostrata* Duch., suggesting a close phylogenetic affinity. However, *A. argentina* is a climbing species with a thickened stem (Ahumada, 1967; González et al., 2015) that belongs to a different informal group characterized by pseudostipules and referred to as 'Stipulosae', and is geographically restricted to Argentina, Brazil, Bolivia, and Paraguay. Based on our observations, *A. argentina* does not appear to have a close morphological affinity with the Chilean taxa. However, the procumbent *A. prostrata* ('Exstipulosae') from Argentina and Bolivia shares morphological features with the Chilean *Aristolochia*, including procumbent habit, reniform leaves, and a tuberous rootstock (González et al., 2015), traits rare in taxa of Neotropical *Aristolochia* occurring outside of Chile.

Taxonomic Adjustments. Our results support the resurrection of *A. pearcei*, first proposed by Saldivia & Faúndez (2015), and its distinction from *A. bridgesii* and *A. vaginans* (Fig. 2). However, we disagree with their identifications of specimens as *A. pearcei* originating from north of La Serena in Coquimbo, Atacama, and Andacollo. Morphometrics on herbarium specimens and studies of field specimens suggest that the material from La Serena and Atacama falls within the variational range of *A. vaginans* in the Coquimbo and Atacama region. Several morphological characters support this conclusion, including the inclination angle of the perianth, the proportions of the flowers, capsules, and leaves, and the length ratio of the petiole to the peduncle plus ovary. Specimens from Andacollo are herein described as a new species, *A. juntucha*, which is distinguished from *A. vaginans* and *A. pearcei*, not only by floral and vegetative features, but also by a significant geographical range disjunction.

We also report the discovery of two additional stenoendemic species, *A. marinae* and *A. distorta* from Choapa province, a region not previously known to harbor the genus. Together with *A. juntucha*, these descriptions double the number of Chilean *Aristolochia* species from three to six, establishing Chile as a significant area of endemism for the genus.

Taxonomic Treatment

Key to the Species of *Aristolochia* in Chile

1. Perianth limb inclination angle > 120° 2
1. Perianth limb inclination angle < 120° 5
2. Tube diameter > 0.8 cm ..... 1. A. vaginans
2. Tube diameter < 0.8 cm ..... 3.
3. Petiole shorter than the peduncle plus ovary in anthetic flowers ..... 3. A. bridgesii
3. Petiole longer than the peduncle plus ovary in anthetic flowers 4
4. Perianth limb larger than the tube and utricle, distorted in anthesis ..... 4. A. distorta
4. Perianth limb smaller than the tube and utricle, not distorted in anthesis ..... 5. A. juntucha
5. Tube cylindrical ..... 2. A. pearcei
5. Tube broadly infundibuliform ..... 6. A. marinae

1. ***Aristolochia vaginans*** Ruiz ex Molina, Sag. Stor. Nat. Chili 2: 132 & 297 (1810). TYPE: Chile: camino de Santiago a Valparaíso y en las inmediaciones de este puerto, Oct 1783, *H. Ruiz s.n.* (holotype: MA [lost], geographical information and date taken from Ruiz (1931)); trekking trail, La Horquilla ravine, access road crossing site, Lot C, National Botanical Garden, Viña del Mar, 33°02'32.22"S, 71°29'28.68"W, 19 Oct 2023 (fl., fr.), *P. Novoa 1361* (**neotype, designated here**: JBN, barcode JBN 4520 [!]; isoneotypes: CONC, barcode CONC 201333 [!]; EIF, barcode EIF 18554 [!]; VALPL, barcode VALPL 2999 [!]). Figs. 4–5; Table 1.

Aristolochia chilensis Bridges ex Lindl., Edwards's Bot. Reg. 20: t. 1680 (1834), **syn. nov.** TYPE: Chile: Quillota, s.d. (fl.), *T. Bridges 22* (**lectotype, designated here:** E, barcode E00319540 [!]); remaining syntype: without locality, s.d., *R. Bevan s.n.* (probably cultivated at K, not extant).

Aristolochia chilensis Miers, *nom. nud.*, Trav. Chil. ii. 531 (1826).

Howardia setigera Klotzsch, Monatsber. Königl. Preuss. Akad. Wiss. Berlin 1859: 617 (1859). TYPE: Chile: In argillos. et rupestrib. secus rivul. ad Valparaíso, Jun 1873 (fl.), *E.F. Pöppig 247* (**lectotype, designated here:** W, accession 0284045 [!]; isolectotypes: W, accessions 0049301 [!] and 0161604 [!]).

Aristolochia setigera Pöppig ex Klotzsch, *nom. inval.,* Monatsber. Königl. Preuss. Akad. Wiss. Berlin 1859: 617 (1859).

Description. Perennial herb, procumbent shoots arising from a subterranean xylopodium, internodes 4–11 cm long. Stems glabrous to sparsely hispid. Leaves deeply reniform, 5–11 × 3–6 cm, leathery, alternate, plain green or variegated with light markings along the veins, adaxial and abaxial surface glabrous to sparsely hispid, base cordate, sinus 0.9–3.5 × 0.5–2 cm, main veins 5–7, leaf apex truncate to retuse. Petioles glabrous to sparsely hispid, 0.3–4.4 cm, pseudostipules absent. Flowers solitary, borne from leaf axils of young shoots. Peduncle plus ovary glabrous to sparsely hispid, 1.0–5.1 cm, ovary 6-carpellate and 6-locular. Gynostemium hexandrous, ca. 5–9 mm. Perianth externally glabrous or sparsely hispid, brown, purple or greenish yellow; utricle ca. 0.9–3.4 × 0.8–2.9 cm; tube cylindrical, ca. 1.6–4.5 × 0.8–2.5 cm, adaxial surface partially sunken in utricle before and during anthesis; limb 1.8–6.0 × 0.8–2.4 cm, supplied by 3–5 primary veins, lateral and apical margins recurved in the anthetic flower, inclination angle 140–190°; dense cover of friable, hispid trichomes inside the tube and limb, rarely absent on limb (in few populations in Atacama). Fruits capsular, six-chambered, cylindrical, ca. 3.4–8.0 × 0.9–2.3 cm. Seeds numerous per fruit, triangular-obovate, approximately 4–5 × 3–4 mm, thick, non-winged, abaxial surface granular, adaxial surface with small elaiosome present.

Additional Specimens Examined. **CHILE. Región II [Antofagasta]. Antofagasta**: Taltal, 20 m, 25°24'S, 70°29'W, 26 Sep 1940 (fl.), *S. Simpfendörfer 10,090* (CONC). **Región III [Atacama]. Copiapó**: Quebrada de Algarrobal, Precordillera, 28°21′38.45"S, 70°25′32.78"W, 22 Nov 2023 (fl., fr.), *[collector and collector no. unreadable] s.n.* (CONC); Caldera: Coastal road from Carrizal Bajo to Totoralillo, 7 m, 28°25′47.9"S, 71°08′21.6"W, 27 Nov 2008 (fl., fr.), *R. Baines* et al. *136* (CONC, E); SW de Copiapó, 27°51′51"S, 71°02′51"W, 28 Aug 2017 (fl.), *C. Delpiano 344* (ULS); Algarrobo, 700 m, 28°15'S, 70°31'W, 1 Sep 1957 (fl.), *J. Martinez 31,476* (CONC); Quebrada de Algarrobal, interior, 500–600 m, 28°58'S, 71°08'W, 16 Nov 1956 (fl.), *M. Ricardi* et al. *4006* (CONC); 5 km al N de Travesia, 750 m, 27°30'S, 70°25'W, 30 Oct 1991 (fl.), *R. Rodriguez 2712* (CONC); interior de la Quebrada Algarrobal, 28°09'S, 70°22'W, 7 Oct 1987 (fl.), *S. Teillier 901* (MO); C-416 near intersection with c322/c416, Quebrada

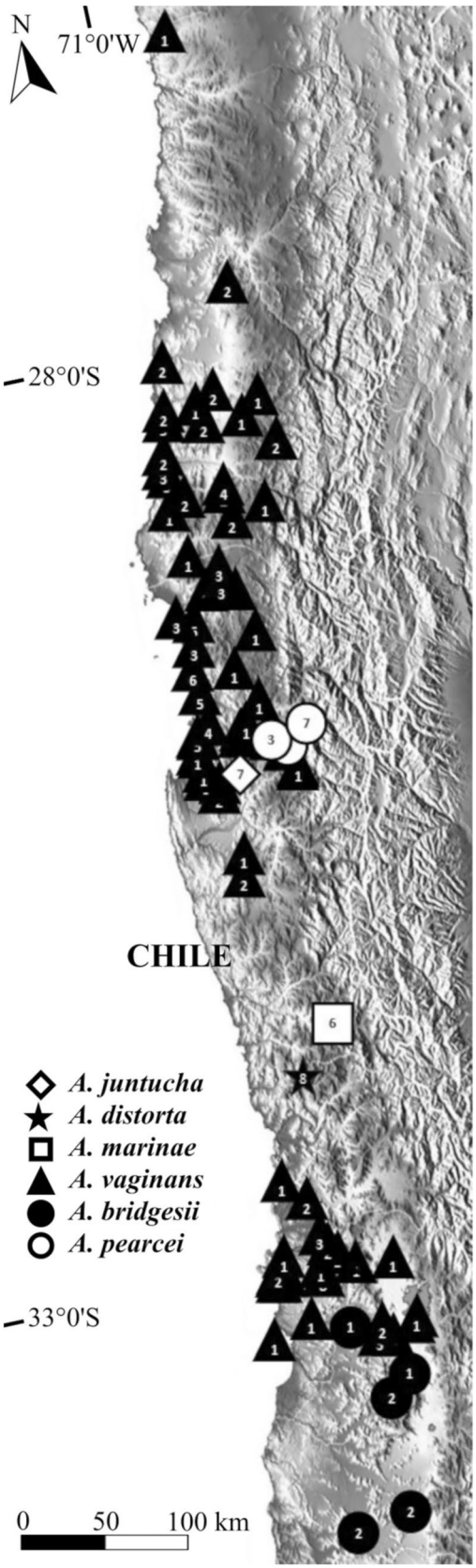

Fig. 5. Distribution of the Chilean *Aristolochia* species. Numbers in the symbols indicate the number of herbarium vouchers from each site.

Totoral, 113 m, 27°52′10.5”S, 70°59′25.7”W, 9 Oct 2022 (fl.), *M. Villalobos 296* (SGO). **Huasco**: Los Toyos on road from Carrizal Bajo to Huasco, 50 m, 28°22′57”S, 71°10′44”W, 27 Oct 2002 (fl.), *M. Ackermann 509* (M); Panamericana Norte, km 659, 7 km südl. Vallenar, 380 m, 18 Nov 1981 (fl., fr.), *E. Bayer 308* (M); Panam. pk 625 depuis Valparaíso, 520 m, 28°50’S, 70°45’W, 24 Oct 1991 (fl., fr.), *F. Billiet* et al. *5342* (MO); Quebrada near Llano del Challe, 30 m, 28°11′40.4”S, 71°08′29.3”W, 2 Oct 2022 (fl.), *N. Caracciolo s.n.* (SGO); Huasco Bajo, 142 m, 21 Aug 2020 (fl.), *R. Contreras 8* (EIF); Sector Aguada Tongoy, road to Los Bronces, seasonally wet quebrada with scattered shrubs, 28°31′6.9”S, 71°09′54.4”W, 6 Dec 2004 (fl.), *DCI 1873* (CONC, E); S Parque Nacional Llanos de Challe, 28°22′17”S, 71°07′51”W, 6 Oct 2017 (fl., fr.), *C. Delpiano 511* (ULS); Carrizal Bajo, Jul 1900 (fl.), *T. King s.n.* (E); Yerbas Buenas, Jan 1872 (fl., fr.), *T. King s.n.* (K); 1 km al NE Majada El Escorial, 28°46′22”S, 70°44′43”W, 20 Nov 2006 (fl.), *L. Letelier* et al. *617* (ULS); Los Cristales, 29°10′39”S, 71°03′13”W, 16 Oct 2006 (fl.), *L. Letelier* et al. *s.n.* (ULS); Majada Fraguita, 28°41′27”S, 71°11′51”W, 14 Oct 2006 (fl., fr.), *L. Letelier* et al. *431* (ULS); Ramadilla un poco al interior de Las Juntas, Valle del Huasco, 28°45’S, 70°29’W, 15 Sep 1957 (fl.), *G. Looser 5719* (CONC); 9 km S of Vallenar on route 5 to La Serena, Atacama Desert, 560 m, 28°38’S, 70°46’W, 10 Feb 1988 (fl., fr.), *C. Marticorena* et al. *9940* (CONC); Cuesta Pajonales, Vallenar, 1,200 m, 29°09’S, 70°59’W, 5 Jan 1973 (fl., fr.), *C. Marticorena* et al. *465* (CONC); Vallenar, 1 Sep 1977 (fl.), *G. Mieres U. s.n.* (EIF); Huasco Bajo, Cabreria, 25 m, 28°28’S, 71°11’W, 14 Aug 1966 (fl.), *G. Montero O. 7577* (CONC); Pajonales, 29°10’S, 71°03’W, 27 Oct 1991 (fl.), *M. Muñoz 2685* (MO); Huasco, 1870 (fl.), *R.A. Philippi s.n.* (B); 1876 (fl.), *R.A. Philippi s.n.* (MO); Vallenar, 300 m, 9 Nov 1984 (fl., fr.), *W. Rauh 66,214* (HEID); Carrizal Bajo, Felsküste, 28°08’S, 71°05’W, 4 Nov 1987 (fl., fr.), *K.H. Rechinger* et al. *63,404* (M); Tal 4 km E Carrizal Bajo, 75 km von Vallenar, 28°08’S, 71°05’W, 4 Nov 1987 (fl., fr.), *K.H. Rechinger* et al. *63,380* (M); Cachiyuyo, 900 m, 29°02’S, 70°54’W, 10 Oct 1958 (fl.), *M. Ricardi* et al. *4890/1275* (CONC); Incahuasi, 20 km al sur, 300 m, 29°22’S, 71°05’W, 10 Oct 1958 (fl.), *M. Ricardi* et al. *4894/1279* (CONC); Quebrada a 10 km al sur, Camino a La Serena, Vallenar, 620 m, 28°40’S, 70°46’W, 12 Nov 1956 (fl., fr.), *M. Ricardi* et al. *3907* (CONC); Totoral, Dto Freirina, 90 m, 28°30’S, 71°06’W, 30 Sep 1952 (fl.), *M. Ricardi 2323* (CONC); Entre Vallenar y Copiapo, Quebrada Chuchampis, frente a Punta de Diaz, 460 m, 28°04’S, 70°37’W, 28 Nov 1980 (fl., fr.), *R. Rodriguez* et al. *1591* (CONC); Jilguero, 3 Dec 2008 (fl., fr.), *s.c. 4817–6* (ULS); Llanos del Challe, 7 Nov 2008 (fl., fr.), *s.c. 2473* (ULS); ibid., 7 Nov 2008 (fl.), *s.c. 2476* (ULS); ibid., 8 Nov 2008 (fl.), *s.c. 2403* (ULS); ibid., 10 Nov 2008 (fl.), *s.c. 2467* (ULS); Camino Mina Algarrobo, 450 m, 28°05’S, 70°46’W, 18 Sep 1965 (fl.), *J. Saa L. 43,931* (CONC); C-461 Quebrada Las Maquinas, 1505 m,

28°18′45”S, 70°16′53”W, 27 Nov 2022 (fl.), *C. de Schrevel 590* (CONC); Ca. 33 km W of rte 5 along the southern (main) road to Carrizal Bajo and Canto del Agua, 300 m, 28°14′46”S, 70°48′49”W, 15 Apr 1994 (fl.), *C.M. Taylor* et al. *11,625* (CONC, MO); Ca. 33 km W of rte 5 along the southern (main) road to Carrizal Bajo and Canto del Agua, 300 m, 28°14′46”S, 70°48′49”W, s.d. (fl.), *C.M. Taylor* et al. *11,625* (ASU); El Bronce, Quebrada, 1,850 m, 28°25’S, 70°18’W, Nov 2007 (fl., fr.), *S. Teillier* et al. *5564* (CONC); Freirina, 15 km S Cerro Blanco, 700–900 m, 28°38’S, 71°04’W, 10 Nov 2004 (fl., fr.), *S. Teillier* et al. *6119* (CONC); Vallenar, La Tunilla, Ruta 5, 535 m, 28°38′13.2”S, 70°45′57.9”W, 10 Oct 2022 (fl.), *M. Villalobos 298* (SGO); Cachiyuyo in der Schlucht Berraquilla, 800 m, 22 Sep 1972 (fl.), *O. Zöllner 6156* (L). **Región IV [Coquimbo]. Elqui**: D-110, La Higuera, 215 m, 29°19′18”S, 71°14′10”W, 12 Nov 2001 (fl., fr.), *C. Aedo 6860* (CONC, MA); Hurtado, 1,630 m, 30°15’S, 70°39’W, 15 Nov 2001 (fl.), *C. Aedo 6901* (CONC); Sector Lagunillas, 30°06’S, 71°21’W, 18 Oct 1987 (fl.), *J. Alfaro A. s.n.* (ULS); Panul, in a seaside hill, 50 m, 29°58′5.4”S, 71°22′18.9”W, 25 Sep 2022 (fl.), *D. Almendras s.n.* (SGO); Ruta D-445, Rio Hurtado, 1,362 m, 30°15′54.6”S, 70°39′30.5”W, 22 Sep 2022 (fl.), *D. Almendras s.n.* (SGO); ibid., 1,418 m, 30°15′45.6”S, 70°39′22.1”W, 23 Sep 2022 (fl.), *D. Almendras s.n.* (SGO); Quebrada San Carlos, 30°04’S, 70°09’W, 10 Jan 1989 (fl.), *Alumno s.n.* (ULS); Camino alternativo CMP, 29°46’S, 71°15’W, 17 Sep 1990 (fl.), *G. Arancio 90,300* (ULS); Cerro Grande, La Serena, 29°56’S, 71°13’W, 25 Aug 1991 (fl.), *G. Arancio 91,031* (ULS); Cuesta Planta Chingoles, 29°27’S, 70°45’W, 21 Sep 1999 (fl.), *G. Arancio 12,016* (ULS); Huachalalume, 29°59’S, 71°23’W, 15 Oct 1993 (fl.), *G. Arancio 94,414* (ULS); Quebrada El Pelicano, 29°10’S, 70°49’W, 23 Sep 1999 (fl.), *G. Arancio 12,047* (ULS); Quebrada Los Choros, 29°19’S, 71°15’W, 20 Sep 1999 (fl., fr.), *G. Arancio 11,912* (ULS); Quebrada San Carlos, 600 m, 30°02’S, 70°49’W, 4 Oct 1990 (fl.), *G. Arancio 90,448* (ULS); Sector Lagunillas, 30°06’S, 71°21’W, 26 Sep 1987 (fl.), *L. Ardiles C. s.n.* (ULS); Coquimbo, s.d. (fl.), *J. Ball s.n.* (E); Cerro Tololo, 1,900 m, 31 Jul 1982 (fl.), *E. Bayer 1113* (M); Quebrada Las Rosas, 29°59’S, 71°21’W, 3 Oct 1992 (fl., fr.), *J. Berengue 35* (ULS); Quebrada Talca, 350 m, 30°01’S, 71°02’W, 16 Nov 1997 (fl., fr.), *F. Billiet* et al. *6988* (MO); Guanaqueros, Ovalle, 100 m, 30°13’S, 71°23’W, 16 Sep 1963 (fl.), *C. Castro 119* (CONC); Quebrada Honda, al norte de La Serena, 22 Dec 1963 (fl.), *C. Castro s.n.* (CONC); Sector Lagunillas, 30°06’S, 71°21’W, 27 Sep 1987 (fl., fr.), *N. Cisterna V. s.n.* (ULS); Totoralillo, 300 m, 20 Sep 1957 (fl.), *A. Consigny s.n.* (EIF); Las Tacas, 1 Oct 1989 (fl.), *A. Gaete 53* (ULS); Sector Lagunillas, 30°06’S, 71°21’W, 26 Sep 1987 (fl.), *J. Galindo D. s.n.* (ULS); Entre La Serena y Vallenar, 16 Oct 1961 (fl.), *A. Garaventa H. 2433* (CONC); Quebrada de Talca, 594 m, 5 Oct 2017 (fl., fr.), *N. Garcia 4784* (EIF); Coquimbo, s.d. (fl.), *C. Gaudichaud 46* (CONC); Guanaqueros, Playa, 23 Sep 1967 (fl.), *W. Gleisner s.n.* (M); Llanos de la Higuera, frente a El Tofo, La Serena, 420 m, 29°27’S, 71°12’W, 16 Sep 1965 (fl.), *G. Gleisner 25* (CONC); La Serena, 10 m, 29°54’S, 71°16’W, 18 Sep 1950 (fl., fr.), *H. Gunckel 54,774* (CONC); Los Choros, La Serena, 10 m, 29°17’S, 71°18’W, 17 Nov 1961 (fr.), *C. Jiles 3947* (CONC); Coquimbo, 28 Feb 1892 (fl.), *O. Kuntze s.n.* (US); Playa Las Estacas, entre Coquimbo y Guanaqueros, 10 m, 30°05’S, 71°22’W, 29 Sep 1984 (fl.), *A. Landero 502* (CONC); About 40 km N of La Serena, just N of Los Hornos along coast, 10 m, 29°37′1”S, 71°17′17”W, 2 Aug 2000 (fl.), *L.R. Landrum* et al. *9831* (ASU, MO); Quebrada Honda, ca. 40 km N of La Serena, along the coast, 10 m, 3 Dec 1987 (fr.), *L.R. Landrum* et al. *5653* (ASU, CONC); Quebrada San Carlos, NE del Cerro Los Mantos, 670 m, 12 Oct 1984 (fl.), *M. Mahú s.n.* (MO); Al oeste del Mineral Los Cristales, quebrada Las Salinas, La Serena, 1,200 m, 29°06’S, 70°58’W, 22 Oct 1971 (fl.), *C. Marticorena* et al. *1738* (CONC); Camino Almirante Latorre a La Serena, 6 km antes de Agua Grande, 550 m, 19 Oct 1971 (fl.), *C. Marticorena* et al. *1558* (CONC); Camino de Marquesa a Condoriaco, Cuesta La Viñita, 1350 m, 29°50’S, 70°50’W, 18 Oct 1971 (fl.), *C. Marticorena* et al. *1529* (CONC); Camino entre La Serena y Vicuña, cerros al frente de la entrada del camino a La Pelicana, 250 m, 29°59’S, 71°01’W, 15 Oct 1963 (fl.), *C. Marticorena* et al. *281* (CONC); Camino La Carretera a Choros Bajos, km 3. Dpto. La Serena, 200 m, 29°20’S, 71°09’W, 21 Oct 1971 (fl.), *C. Marticorena* et al. *1660* (CONC); Quebrada Pelicano, 8 km al sur de la junta con el camino al Observatorio Astronómico La Silla, 850 m, 29°12’S, 70°50’W, 22 Oct 1971 (fl.), *C. Marticorena* et al. *1756* (CONC); Sector Lagunillas, 30°06’S, 71°21’W, 26 Sep 1987 (fl.), *X. Martínez s.n.* (ULS); El Faro, 50 m, 29°58’S, 71°21’W, 15 Sep 1980 (fl.), *G. Montero O. 2837* (CONC); La Serena, 10 m, 29°54’S, 71°16’W, 1 Nov 1954 (fl.), *E. Moreno 2765* (CONC); Coquimbo, 29°57’S, 71°20’W, 3 Oct 1992 (fl.), *C. Olivares 8* (ULS); Sector Lagunillas, 30°06’S, 71°21’W, 26 Sep 1987 (fl.), *A.P. Parraguez s.n.* (ULS); Coquimbo, 2 Mar 1905 (fl.), *R.A. Philippi 547* (US); Las Tacas, 1 Oct 1989 (fl., fr.), *M. Ponce 77* (ULS); Totoralillo, 89 m, 4 Oct 2015 (fl.), *P. Ramirez s.n.* (EIF); El Tofo, Dpto La Serena, 550 m, 29°27’S, 71°14’W, 24 Feb 1965 (fl.), *M. Ricardi 5262* (CONC); Mina El Romeral, 110 m, 17 Aug 2006 (fl.), *A. Romeral 2943_7114* (ULS); at Coquimbo, vicinity of La Serena, 11 Oct 1914 (fl.), *J.N. Rose 19,309* (US); Marqueza, 400 m, 10 Nov 2001 (fl.), *s.c. s.n.* (ULS); Panamericana km 789, 27°30’S, 70°25’W, 21 Sep 1960 (fl.), *J. Saa L. s.n.* (CONC); Entre La Serena y Vallenar, Nov 1975 (fl., fr.), *G. Schilling s.n.* (CONC); Los Choros, cerca de la playa, 10 m, 29°18’S, 71°20’W, 10 Oct 1957 (fr.), *M. Silva s.n.* (CONC); Lagunillas, 100 m, 30°06’S, 71°21’W, 1 Sep 1987 (fl.), *F.A. Squeo 87,043* (CONC); Sector Lagunillas, 30°06’S, 71°21’W, 9 Jun 1905 (fl.), *F.A. Squeo 87,043* (ULS); Las Tacas, 30°06’S, 71°23’W, 27 Sep 1987 (fl.), *A. Tapia 87* (ULS); Rte 5, N of La Serena, ca. 1 km N of the entrace to the El

Tofo mine, at a bridge over a dry creek, 29°30'S, 71°15'W, 30 Oct 1991 (fl., fr.), *C.M. Taylor* et al. *10,668* (ASU, CONC); Rte 5, N of La Serena, ca. 1 km N of the entrace to the El Tofo mine, at a bridge over a dry creek, 29°30'S, 71°15'W, 30 October 1991 (fl., fr.), *C.M. Taylor* et al. *10,668* (MO); Caleta Hornos, 26°36'S, 71°17'W, 17 Oct 1992 (fl.), *N. Tobar 18* (ULS); Quebrada San Carlos, 16–17 Oct 1974 (fl.), *H. Torres* et al. *s.n.* (CONC); Cuesta Buenos Aires, 29°33'S, 71°15'W, 3 Oct 1992 (fl., fr.), *S. Vásquez 1* (ULS); Mina El Romeral, 29°43'S, 71°14'W, 15 Sep 1990 (fl.), *A. Villalob 15* (ULS); Sector Lagunillas, 30°06'S, 71°21'W, 27 Sep 1987 (fl.), *J. Villalobos N. s.n.* (ULS); Totoralillo beach, 56 m, 30°04′0.3"S, 71°22′20"W, 10 Oct 2022 (fl.), *M. Villalobos 302* (SGO); Mineral El Guanaco, 40 km al interior de Estacion Marquesa, 7 Sep 1940 (fl.), *R. Wagenknecht H. 4002* (CONC); Coquimbo, 100 m, Nov 1923 (fl.), *E. Werdermann 111* (E, MO); Coquimbo, on rocky point between Coquimbo and Herradura Bay, 100 m, 19 Nov 1935 (fl.), *J.A. West 3880* (MO, US); Quebrada Honda and Cuesta Buenos Aires, ca. 45–60 km north of La Serena, 100 m, 1 Nov 1938 (fr.), *C.R. Worth* et al. *16,332* (MO); bei Juan Soldado, 15 Sep 1968 (fr.), *O. Zöllner 2750* (L); in the Valley of Rio Seco Los Choros, 21 Sep 1975 (fl.), *O. Zöllner 8707* (MO, RB); Las Tacas, 30°06'S, 71°23'W, 26–27 Sep 1987 (fl., fr.), *s.c. 89* (ULS). **Limarí**: Cuesta Las Cardas, 500 m, 30°18'S, 71°16'W, 14 Sep 1948 (fl.), *F. Behn s.n.* (CONC); Valle del Encanto, al sur de Ovalle, 300 m, 30°43'S, 71°14'W, 14 Sep 1965 (fl.), *G. Gleisner 4* (CONC); Depto. Ovalle, Cuesta Las Cardas, 500 m, 30°18'S, 71°16'W, 24 Sep 1950 (fl.), *C. Jiles s.n.* (M); ibid., 14 Oct 1944 (fl.), *C. Jiles 63* (CONC); El Reloj, Dpto Ovalle, 500 m, 30°40'S, 71°11'W, 8 Sep 1949 (st), *C. Jiles 1320* (CONC); Punitaqui, pleno campo, Depto Ovalle, 300 m, 30°52'S, 71°12'W, 4 Sep 1949 (fl.), *C. Jiles 1278* (CONC); Quebrada Tongoicillo, entre los arbustos, 240 m, 30°10'S, 71°21'W, 12 Sep 1948 (fl.), *C. Jiles 860* (CONC); Cuesta Las Cardas, ca. 45 km S of La Serena on road to Ovalle, 20.3 km S of turnoff to Andacollo, 500–600 m, 30°15'S, 71°15'W, 22 Sep 1991 (fl.), *L.R. Landrum* et al. *7526* (ASU, CONC, MO); Las Cardas, 30°14'S, 71°15'W, 25 Sep 1980 (fl.), *V. Peña 80* (ULS); Rapel, 7 Dec 1976 (st), *H. Valenzuela 38–6* (EIF). **Región V [Valparaíso]. Marga Marga**: in Marga-Marga, Tal, 8 Oct 1972 (fl.), *O. Zöllner 6282* (L); ibid., 24 Aug 1971 (fl., fr.), *O. Zöllner 5161* (L); Quilpué, 27 Sep 1967 (fl.), *O. Zöllner 1746* (L). **Petorca**: Papudo, La Ligua, Aconcagua, 20 m, 32°31'S, 71°25'W, s.d. (fl.), *U. Abarcal 124–91* (CONC). **Quillota**: Hijuelas y Olmue, Parque Nacional La Campana, 430 m, 32°55′50.1"S, 71°04′58.6"W, 12 Oct 2000 (fl.), *M.K. Arroyo 205,046* (CONC); Palo Quemados, 390 m, 32°37'S, 71°16'W, 25 Mar 1905 (fl., fr.), *V. M.Baeza s.n.* (CONC); In petrosis sylvaticis Quillota, Oct 1829 (fl.), *C.L. Bertero 814* (L); Olmué: Parque Nacional La Campana (Sector Ocoa), route to Las Cascadas, 951 m, 32°58′27.5"S, 71°07′03.2"W, 28 Nov 2004 (fl., fr.), *Darwin Chilean Initiative 1709* (E); Cerro Cruz, Limache, 900 m, 33°06'S, 71°16'W, 12 Oct 1931 (fl.), *A. Garaventa H. 2463* (CONC); Cerro Cruz, Limache, 900 m, 33°06'S, 71°16'W, 12 Oct 1931 (fl.), *A. Garaventa H. 2462* (CONC); ibid., 10 Dec 1927 (fl.), *A. Garaventa H. 626* (CONC); El Pangal, Limache, 160 m, 33°02'S, 71°16'W, 19 Sep 1929 (fl.), *A. Garaventa H. 1049* (CONC); El Salto, Limache, 7 Oct 1933 (fl.), *A. Garaventa H. 4842* (CONC); Entre La Quebrada de la Dormida y Morado, Limache, 30 m, 33°03'S, 71°00'W, 23 Oct 1928 (fl.), *A. Garaventa H. 625* (CONC); Limache, Cerro de la Cruz, 28 Nov 1927 (fl.), *A. Garaventa H. s.n.* (M); Limache, 1908 (fl., fr.), *W.B. Gourlay s.n.* (E); Entre La Quebrada de la Dormida y Morado, Limache, 40 m, 3 Oct 1927 (fl.), *G. Looser 271* (SI); Limache Fundo Pangal, cerca de Valpo, 160 m, 33°02'S, 71°16'W, 19 Sep 1929 (fl.), *G. Looser 966* (CONC); Parque Nacional La Campana, Las Palmas de Ocoa, orilla del camino, 1983 (fl.), *M. Mahú s.n.* (MO); Parque Nacional La Campana, sector Ocoa, 480 m, 32°56'S, 71°05'W, 15 Aug 2006 (fl.), *S. Pfanzelt 149* (CONC); Cuesta del Melon, 560 m, 32°40'S, 71°15'W, 13 Sep 1957 (fl.), *M. Ricardi* et al. *4224/609* (CONC); Hijuelas, 13 Sep 1933 (fl.), *s.c. 712* (fr.). **San Felipe de Aconcagua**: Llayllay, Cuesta Las Chilcas, 493 m, 5 Oct 2018 (fl., fr.), *N. Garcia 5161* (EIF). **Talagante:** Padre Hurtado, Cuesta Barriga, 777 m, 12 Oct 2018 (fl.), *N. Garcia 5199* (EIF). **Valparaíso**: Valparaíso, 350 m, 32°30′10.6"S, 70°55′37.8"W, 23 Sep 1999 (fl.), *M.K. Arroyo 992,183* (CONC); Camino a Laguna Verde, 200 m, 8 Oct 1922 (fl.), *K. Behn s.n.* (CONC); Valparaíso, 33°02'S, 71°38'W, 31 Jul 1932 (fl.), *K. Behn s.n.* (CONC); Valparaíso, 8 Oct 1922 (fl.), *F. Behn s.n.* (SI); ibid., 17 Aug 1930 (fl.), *F. Behn s.n.* (SI); ibid., 21 Jul 1932 (fl.), *K. Behn s.n.* (M); ibid., s.d. (st), *C.L. Bertero s.n.* (US); ibid., Sep 1928 (fl.), *O. Buchtien s.n.* (L); ibid., Sonnige Abhänge [sunny slopes], 8 Oct 1895 (fl., fr.), *O. Buchtien s.n.* (US); ibid., Oct 1925 (fl.), *B. Claude-Joseph 3705* (US); ibid., s.d. (fl.), *H. Cuming 509* (E); Valparaíso, al norte, s.d. (fl.), *F. Delfin 102* (MO); Valparaíso, 150 m, 1 Aug 1933 (fl.), *C. Grandjot s.n.* (CONC); ibid., 100 m, Aug 1935 (fl.), *C. Grandjot s.n.* (MO); Torpederas, sea cliffs, Aug 1916 (fl.), *J.W. Harshberger 1083* (US); Casa Blanca, May 1856 (fl.), *W.H. Harvey s.n.* (E); Valparaíso, s.d. (fl.), *J.D. Hooker s.n.* (E); Playa Ancha, Quebrada "La Tortuga", 24 Jul 1931 (fl.), *C. Junge 5* (MO, SI); Viña del Mar, Jul 1900 (fl.), *T. King s.n.* (E); Sausalito, 1 Feb 1989 (fl.), *J. Manzur s.n.* (EIF); s.d. (fl.), *A. Mathews 272* (E); Concón, s.d. (fl.), *J. Miers 98* (BM); Ladera sendero trekking, quebrada La Horquilla, lado cruce camino acceso, Lote C. Jardín Botánico Nacional, 98 m, 33°02′32"S, 71°29′29"W, 17 Aug 2023 (fl., fr.), *P. Novoa 1355* (JBN); s.d. (fl.), *s.c. s.n.* (MO, ULS); Las Lucumas, 40 m, 33°02'S, 71°38'W, 1 Mar 1958 (fl.), *F. Schlegel 1626* (CONC); Valparaíso, 1876 (fl.), *A. von Dessauer s.n.* (M). **Región XIII [Metropolitana]. Chacabuco**: Cerro Portrerillos, 100 m, 26 Oct 1971 (fr.), *S.C. Keeley 238* (SDSU). **Santiago**: Quebrada de La Plata, 680 m, 33°29'S, 70°54'W, [unreadable] (fl.), *[unreadable] s.n.* (CONC); Santiago, 15 Sep 1918 (fl.), *B. Claude-Joseph 505* (US); Santuario de la

Naturaleza Quebrada de la Plata, 520 m, 16 Jan 2006 (fr.), *N. Garcia 2713* (EIF); Santiago, 1833 (fl.), *C. Gay s.n.* (STU); Santiago, 1853 (fl.), *C. Gay s.n.* (STU); Cerro San Cristobal, 800 m, 33°25'S, 70°38'W, 1 Oct 1968 (fl.), *H. Gunckel 52,258* (CONC); Santiago, Lo Valdés, 2,100 m, 1 Dec 1957 (fl.), *H. Gunckel 53,732* (CONC); El Quisco, 80 m, 33°23'S, 71°43'W, 14 Sep 1941 (fl.), *H. Gunckel 11,555* (CONC); Cuesta de Lo Prado, 750 m, 1 Nov 1931 (fl.), *G. Looser 20* (SI); Peñaflor, cerca de Santiago, 400 m, 33°25'S, 70°54'W, 20 Sep 1930 (fl.), *G. Looser s.n.* (CONC); Santuario de la Naturaleza Quebrada de la Plata, 721 m, 24 Sep 2017 (fl.), *T. Martinez s.n.* (EIF); Cerro, Peñaflor, 400 m, 33°25'S, 70°54'W, 13 Oct 1923 (fl.), *G. Montero O. 1490* (CONC); Paso de la Sepultura, San Antonio, 60 m, 1 Nov 1965 (fl.), *I. Ruiz 44,071* (CONC); Lo Prado, dpto Santiago, 200 m, 33°29'S, 70°59'W, 13 Sep 1954 (fl.), *F. Schlegel 173* (CONC); Rinconada de Lo Cerda, Quebrada de La Plata, ladera norte, 500 m, 11 Sep 1960 (fl.), *F. Schlegel 2787* (CONC); Rinconada de Lo Cerda, Quebrada de La Plata, ladera norte, quebrada Los Labradores, 900 m, 6 Aug 1958 (fl.), *F. Schlegel 1648* (CONC); Santuario de la Naturaleza Quebrada de la Plata, 500 m, 11 Sep 1960 (fl., fr.), *F. Schlegel s.n.* (EIF). **Without Precise Locality:** Valparaiso-Viña del Mar, 20 m, 21 Aug 1933 (fl.), *K. Behn s.n.* (CONC); Valparaíso and Coquimbo, 100–400 ft, Sep 1927 (fl, fr), *C. Elliot 23* (E); 02 Nov 2008 (fl, fr), *D. Florido s.n.* (ULS); 1886 (fl.), *G.H.W. Frömbling s.n.* (M); s.d. (fl, fr), *INIA BB25* (ULS); Jul 1878 (fl.), *Miers s.n.* (K); 1927 (fl.), *s.c. s.n.* (L); s.d. (fl.), *s.c. s.n.* (ULS); s.d. (fl, fr), *s.c. s.n.* (ULS).

Distribution & Ecology. *Aristolochia vaginans* is a rhoendemic species, distributed in two remarkably disjunct populations, a northern population in Atacama to North Coquimbo (at elevations from sea level to 2,000 m) and a southern population in south Coquimbo to Valparaiso and Metropolitan Regions (sea level to 1,000 m) (Figs. 3B, 5). Although most of the populations appear to prefer maritime climatic conditions in sun-exposed areas in sclerophyllous secondary forest and xeric shrubland, some populations in the very north are occasionally found in gorges and valleys with a more continental climate and higher elevation, with inner Mediterranean desert scrub of *Skytanthus acutus* Meyen (Apocynaceae) and *Atriplex deserticola* Phil. (Amaranthaceae) (Luebert & Pliscoff, 2006). Flowers were observed to be visited by flies, attracted by their putrid odor, and dissected flowers revealed minute beetles and collembolans inside. Eggs and larvae of the butterfly *Battus polydamas psittacus* (Molina, 1782) have been seen on wild plants (Urzúa et al., 2009; Ramos-González et al., 2018; González-Teuber et al., 2023).

Phenology. *Aristolochia vaginans* flowers between September and January, with occasional records in May and June. Fruits have been observed from September to January.

Ethnobotany. The roots of *Aristolochia vaginans* were used in Central Chile during the nineteenth and twentieth centuries as an anti-hemorrhagic agent and to expel the residual placenta after childbirth (Cordero et al., 2022; Paizanni Guillén et al., 2025). However, this species has a high concentration of aristolochic acids, which are genotoxic, mutagenic, and nephrotoxic, making it a plant of high health risk that should not be used for medicinal purposes.

Preliminary Assessment of Extinction Threat. *Aristolochia vaginans* is represented by 216 records from 155 locations in our database. The estimated EOO and AOO are 70,644 km^2 and 536 km^2, respectively, and the species occurs across a broad range of habitats and within some protected areas with negligible human interference by urbanization, thus showing little or no evidence of decline. As there are no significant threats affecting its populations, we propose that the species be categorized as LC (least concern) (see IUCN, 2012, 2013, 2024).

Remarks. Miers (1826) listed the name *Aristolochia chilensis* in the index of volume 2 of *Travels in Chile and La Plata*, but did not provide a description of the corresponding taxon, thus rendering it a *nomen nudum*. Subsequently, Lindley (1835) validly published *A. chilensis* with a detailed description and diagnosis, citing in the protologue collections gathered by Bridges and by Bevans. Of those collections, the Bridges specimen at E is the only extant original material that we know of, and we thus designate it as lectotype.

In an earlier publication that has seemingly been overlooked by subsequent authors, Molina (1810) described a species of *Aristolochia* from Chile as "leaves reniform, spotted, sparsely hispid flowers dark purple, filiform stems and prostrate habit and contort capsules, nauseous odor" clearly matching the diagnostic characters of *A. chilensis* sensu Lindley (1835). Molina referred to the taxon as *A. vaginans* Ruiz; however, that name was a *nomen nudum* and not validly published since Ruiz's diary entries from 1783, where the name first appeared, were not accessible to the public (see Turland et al., 2018, Article 29). Following Article 46.5, Molina's description affected the valid publication of *A. vaginans* Molina ex Ruiz, which as the oldest available name for the taxon at the species rank must be treated as the accepted name.

Since neither Ruiz nor Molina designated any particular specimen under the name *Aristolochia vaginans*, and as we are unaware of any specimens collected, preserved or examined by either of the two authors following a thorough search, we designate as neotype a specimen originating from the approximate region where the species was first located according to Ruiz (i.e., "between Santiago and Valparaíso as well as in the surroundings of the latter harbor").

Our geometric morphometric analysis corroborates the synonymy of *Howardia setigera* Klotzsch with *Aristolochia*

vaginans by placing the type material of the former name (*Pöppig 247*) well within the phenotypical range of *A. vaginans* from Valparaíso.

While flower shape and other vegetative characters appear to be stable across populations of this species, flower color exhibits considerable variation (Valdivia & Niemeyer, 2007; Urzúa et al., 2009; Stotz & Gianoli, 2013). In the northern populations, some specimens have the whole perianth entirely yellow, entirely purple, or some combination of the two colors (Fig. 4). In contrast, specimens from southern populations are more homogeneous with a purple external perianth and a pale yellow internal perianth color. This phenomenon of exhibiting two color morphs and bicolored intermediates (usually purple-brown vs. pale yellow) appears to be common in numerous *Aristolochia* species from other continents but also in the series *Hexandrae* (e.g. *A. leuconeura* Linden, *A. pilosa* Kunth, *A. ridicula* N.E.Br., and many more; pers. observation, D. Frank).

The interior of the tube and limb in *Aristolochia vaginans* is covered in a dense layer of friable (sparsely hispid) trichomes in the vast majority of populations (Fig. 4). However, a few populations from the northern end of the distribution in the Atacama Desert show an absence of these trichomes on the margin of the limb (Fig. 4A).

2. *Aristolochia pearcei* Phil., Anales Univ. Chile 18: 68 (1861). TYPE: [Chile:] 1860 (fl.), *R. Pearce s.n.* (lectotype: SGO, barcode 47944 [!], designated by Saldivia & Faúndez, 2015: 369), non *Aristolochia pearcei* Mast., J. Linn. Soc., Bot. 14: 493 (1875). Figs. 5, 6, Table 1.

Description. Perennial herb, procumbent shoots arising from a subterranean xylopodium, internodes 4–10 cm long. Leaves alternate, reniform to hastate, 4–7 × 3–4 cm, leathery, glaucous green to yellowish green, with irregular light markings along the veins, adaxial and abaxial surface puberulent, sinus 1–3 × 0.3–1 cm, main veins 5–7, leaf apex truncate to retuse. Petioles puberulent, 0.5–3.4 cm, pseudostipules absent. Flowers solitary from leaf axils of young shoots. Peduncle plus ovary puberulent, 0.6–3.9 cm, ovary 6-carpellate and 6-locular. Gynostemium hexandrous, ca. 4–7 mm. Perianth externally glabrous, pale green to yellow, yellow within. Utricle ca. 0.6–1.6 × 0.6–1.2 cm. Tube cylindrical, ca. 1.2–3.3 × 0.2–0.6 cm, dense cover of friable, hispid trichomes inside the tube and limb. Limb 2.5–4.1 × 0.8–1.3 cm, supplied by 3–5 primary veins, lateral and apical margins recurved in the anthetic flower, inclination angle 75–120°. Fruits capsular, six-chambered, cylindrical, ca. 3.6–5.7 × 1.3–2.0 cm. Seeds triangular-obovate, approximately 4–5 × 3–4 mm, thick, non-winged, abaxial surface granular, adaxial with small elaiosome present.

Additional Specimens Examined. **CHILE. Región IV [Coquimbo]. Elqui:** Quebrada San Carlos, 610 m, 30°03′27”S, 70°48′57”W, 24 Sep 2024 (fl.), *D. Almendras 350* (EIF); Ruta D-445, Vicuña, 915 m, 30°05′55”S, 70°43′7.3”W, 22 Sep 2022 (fl.), *D. Almendras s.n.* (SGO); Paihuano, 30°01’S, 70°31’W, 17 Oct 1992 (fl.), *C. Becerra 8* (ULS); ibid., 950 m, 19 Sep 1948 (fl.), *F. Behn s.n.* (CONC); Paihuano, Quebrada del Chanchoqui, 900 m, 25 Sep 1948 (fl.), *F. Behn s.n.* (CONC); ibid., 800 m, 23 Sep 1948 (fl.), *F. Behn s.n.* (CONC); ibid., 950 m, 10 Oct 1948 (fr.), *F. Behn s.n.* (CONC); Quebrada de Vicuña a Hurtado, 1,300 m, 30°08’S, 70°41’W, 3 Sep 2000 (fl.), *A. Marticorena 512* (CONC); Paihuano, 30°01’S, 70°31’W, 26 Sep 1993 (fl.), *M. Peña 27* (ULS); Quebrada San Carlos, 700 m, 30°05’S, 70°48’W, Dec 1974 (fl.), *R. Torres* et al. *s.n.* (CONC)

Distribution & Ecology. *Aristolochia pearcei* is endemic to Coquimbo in the upper Elqui River basin (between San Carlos and Paihuano). It is found in the Chilean Mediterranean Interior Semi-Desert Scrub & Grassland (Luebert & Pliscoff, 2006), dominated by *Leucostele chiloensis* (Colla) Schlumpb. and *Eulychnia acida* Phil. (both Cactaceae), *Neltuma chilensis* (Molina) C.E.Hughes & G.P. Lewis and *Vachellia caven* (Molina) Seigler & Ebinger (both Fabaceae), and *Cordia decandra* Hook. & Arn. (Cordiaceae), in gorges and valleys with a continental climate and medium to high elevation from 700 to 1,400 m (Fig. 3B). Dissected flowers revealed small insects inside the utricle, such as Mycetophilidae (Diptera) and Gelechiidae (Lepidoptera).

Phenology. *Aristolochia pearcei* flowers between September and December, and fruits have been observed from October to January.

Preliminary Assessment of Extinction Threat. We record *Aristolochia pearcei* from 11 points representing seven locations. The estimated EOO and AOO are 165 km^2 and 24 km^2, respectively. The restricted distribution area is threatened by anthropogenic pressure, including goat grazing (cf. Nico Arcos, pers. comm.), human settlement expansion, and land-use change. Given its limited range and present threats, we suggest *A. pearcei* should be categorized as EN (endangered) under Criterion B (B1ab(iii) + 2ab(iii)) (see IUCN, 2012, 2013, 2024).

Remarks. *Aristolochia pearcei* has been treated as a synonym of *A. bridgesii* (e.g., Ruiz, 2001; Urzúa et al., 2009; Saldivia & Faúndez, 2015), but the distribution of the latter species, which is endemic to Región VI [O'Higgins] and Región XIII [Metropolitana], is 300 km to the south of the distribution of *A. pearcei*. Plate 7a in Ruiz (2001), labelled as "*A. bridgesii*", agrees morphologically with *A. pearcei* following the description provided herein and by Saldivia and Faúndez (2015).

The confusion may stem from the unclear origin of the type specimen of *Aristolochia pearcei* (Philippi, 1865).

Fig. 6. Anthetic flowers in frontal view (top row) and lateral view (bottom row). **A.** *Aristolochia pearcei*. **B.** *Aristolochia bridgesii*. [Scale bar: A–B, 3 cm. Photos (all reproduced with permission): A. (top), by Nico Arcos, near San Isidro, Coquimbo, unvouchered; A. (bottom), by Diego Almendras, voucher *D. Almendras s.n.*; B. (top), by Matías González, near San Vincente de Tagua Tagua, O'Higgins, unvouchered; B. (bottom), by Miguel Matías Espinoza Peña, near San Vincente de Tagua Tagua, O'Higgins, unvouchered.]

Philippi (1895) himself noted that the locality Chillán, from where *A. pearcei* was reported, was located far outside the known ranges of *Aristolochia* species in Chile, stating "having received this plant from Mr. Pearce without indication of the locality, along with plants he had collected in the Chillán mountain ranges […] as their homeland. This is an error; it grows in the Huasco Valley near Yerbas Buenas, etc." However, no other reports of *Aristolochia* were subsequently made from this area, apart from the widespread species *A. vaginans*.

Saldivia & Faúndez (2015) were the first to discover that the morphology of the type specimen of *Aristolochia pearcei* aligns with that of populations in the east of Elqui province. Here, we corroborate their findings by morphometric results, which place the type specimen of *A. pearcei* within the phenotypic landscape of populations located between Quebrada San Carlos and Paihuano.

In herbaria, *Aristolochia pearcei* is frequently misidentified as *A. vaginans*; however, the two species can be distinguished by several characters (see Table 1), especially by the inclination angle of the limb. In comparison to *A. vaginans*, the flowers of *A. pearcei* more frequently exhibit lighter coloration and/or yellow-green tones (Figs. 4, 6). Notably, we observed *A. vaginans* and *A. pearcei* growing sympatrically in the Quebrada de Mollaca and Quebrada San Carlos. East of these sites, only *A. pearcei* has been recorded. However, we have been unable to document hybrids or populations with clearly intermediate features between the two species. In areas where their distributions overlap, the two species may avoid hybridization by attracting different pollinators of different sizes. Indeed, the tube of *A. pearcei* is considerably narrower than in *A. vaginans*, and thus may restrict access to smaller insects than the broader tube of *A. vaginans*.

3. *Aristolochia bridgesii* (Klotzsch) Duch., Prodr. [A.P. de Candolle] 15(1): 463 (1864). TYPE: Chile: Colchagua, *T. Bridges s.n.* (lectotype: K, barcode K000323645 [!], designated by Saldivia & Faúndez (2015: 370)). *Howardia bridgesii* Klotzsch, Monatsber. Königl. Preuss. Akad. Wiss. Berlin 1859: 618 (1859). Figs. 5, 6, Table 1.

Description. Perennial herb, procumbent shoots arising from a xylopodium, internodes 3–6 cm long. Leaves alternate, reniform, 3–4×2–3 cm, vivid green with irregular light markings on the veins, adaxial surface glabrous, abaxial surface sparsely hispid, sinus 0.6–1.6×0.7–1 cm, main veins 5–7, leaf apex truncate to retuse. Petioles sparsely hispid, 0.7–2.5 cm, pseudostipules absent. Flowers solitary from leaf axils of young shoots. Peduncle plus ovary glabrous, 1.6–4.0 cm, ovary 6-carpellate and 6-locular. Gynostemium hexandrous, ca. 2–4 mm. Perianth externally glabrous, brown to purple color, lighter or yellow within. Fruits capsular, six-chambered, cylindrical, ca. 3.3–4.1×1.1–1.4 cm. Utricle ca. 0.5–1.0×0.3–0.9 cm. Tube cylindrical, ca. 1.1–2.1×0.2–0.5 cm, dense cover of friable, hispid trichomes inside the tube. Limb 2.8–4.0×0.4–1.0 cm, supplied by 3–5 primary veins, lateral and apical margins recurved in the anthetic flower, trichomes absent, inclination angle 120–150°. Seeds triangular, approximately 4–5×3–4 mm, thick, non-winged, abaxial surface granular, adaxial surface with small elaiosome present.

Additional Specimens Examined. **CHILE. REGIÓN VI [O'HIGGINS]. Cachapoal:** Cerro Pangalillo, El Tambo, San Vicente de Tagua Tagua, 34°29'24.3"S, 70°59'10.0"W, 452 m, 05 Jan 2023 (fr.), *D. Almendras s.n.* (SGO); ibid., 34°29'26.7"S, 70°59'12.2"W, 474 m, 05 Jan 2023 (fr.), *D. Almendras s.n.* (SGO); San Vicente de Tagua Tagua, Cerro Sepultura, 23 Aug 2023 (fl.), *N. Garcia s.n.* (EIF). **Región XIII [Metropolitana]. Maipo**: Cuesta el Cepillo, Rangue, camino a Cholqui, 600 m, 33°51'S, 70°58'W, Nov 1990 (fl.), *L. Faúndez Y. s.n.* (CONC); Cuesta el Cepillo, Rangue, camino a Cholqui, 600 m, 33°51'S, 70°58'W, 01 Nov 1990 (fl.), *L. Faúndez Y. s.n.* (CONC); San Francisco de Aculeo, Hospital, Santiago, 350 m, 33°50'S, 70°56'W, 29 Oct 1976 (fl.), *G. Montero O. 10246* (CONC); Condominio Bosques de Aculeo, Rangue, 430 m, 3 Oct 2021 (fl.), *S. Teillier* et al. *8593* (CONC). **Melipilla**: Reserva Nacional Robleria de Cobre de Loncha, Alhue, 560 m, 34°08'56.2"S, 71°01'24.4"W, 6 Dec 2000 (st.), *M.K. Arroyo 206547* (CONC); Curacaví, 1898 (fl.), *T. Bridges s.n.* (BM). **Without precise locality:** s.d. (fl.), *T. Bridges s.n.* (B).

Distribution & Ecology. *Aristolochia bridgesii* is endemic to the Coastal Range and intermediate depression of the South Metropolitan Region and O'Higgins Region, and may be present in the Maule Region, with the Mataquito river as southern limit (D. Almendras, pers. comm.). It is found in the margins of sclerophyllous shrubland in the northern distribution of the Chilean Mediterranean Deciduous Forest (Luebert & Pliscoff, 2022), dominated by *Leucostele chiloensis* (Colla) Schlumpb., *Peumus boldus* Molina (Monimiaceae), *Lithraea caustica* (Molina) Hook. & Arn. (Anacardiaceae), and *Colliguaja odorifera* Molina (Euphorbiaceae), with a seasonally humid climate, at elevations from 100 to 600 m (Fig. 3B). A dissected flower in situ revealed a small Forcipomyiinae (Diptera) carrying pollen grains.

Phenology. *Aristolochia bridgesii* flowers from mid-July to mid-December, with occasional flowering events as early as March. Fruits have been observed from late December to January.

Preliminary Assessment of Extinction Threat. *Aristolochia bridgesii* is here recorded from 11 occurrence points representing nine locations. The estimated EOO and AOO are 4,413 km^2 and 32 km^2, respectively. The distribution area is small but not considerably affected by urban development, and parts of the population are covered by

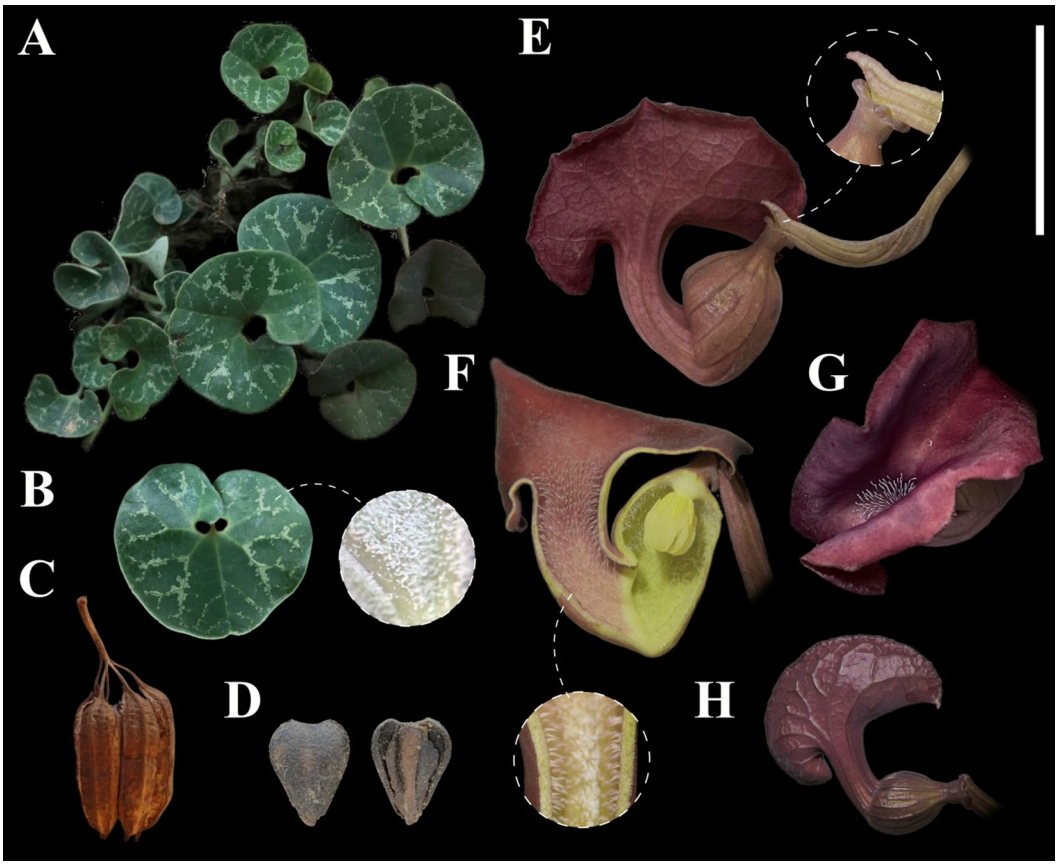

Fig. 7. *Aristolochia distorta*. **A.** Habit. **B.** Leaves; note the tomentose abaxial leaf surface. **C.** Fruit. **D.** Seed. **E–G.** Anthetic flower, in lateral view (E), in longitudinal section (F), and in frontal view (G). Note the restriction of trichomes to the tube (F). **H.** Pre-anthetic flower. [Scale bars: A, 3 cm; B–C, 4 cm; D, 1 cm; E–H, 2.5 cm. Photos (all reproduced with permission): A–C and E–H, by Diego Almendras from the type gathering; D, by Marco Ebert from the type gathering].

private and public parks. We propose that *A. bridgesii* should be categorized as VU (vulnerable) based on Criterion B (B1(a,b(iii)) + 2(a,b(iii)) (IUCN 2012, 2013, 2024).

Remarks. The flowers of *Aristolochia bridgesii* are occasionally partially lacking in purple pigment. Indeed, the species is sometimes locally referred to as "Oreja de Zorro amarilla", meaning Yellow Fox Ear, but typically only a very small number of individuals of a given population are yellow. It appears that the application if this vernacular name to *A. bridgesii* stems from previous attribution of the name to populations of *A. pearcei* and *A. juntucha* (Rodriguez et al., 2018).

4. *Aristolochia distorta* D. Frank, D. Almendras, M. Cisternas & P. Novoa, **sp. nov.** TYPE: [Chile:] Coquimbo, Choapa, Los Vilos, ladera pedregosa, estero Pupio, 545 m, 31°57'40"S, 71°05'50"W, 14 Aug 2024 (fl., fr.), *M. Cisternas s.n.* (holotype: JBN, barcode 4549 [!]; isotypes: JBN, barcodes 4555 [!] and 4556 [!]; CONC, barcode CONC 201334 [!]; EIF, barcode EIF 18555 [!]; VALPL barcode VALPL 3000 [!]). Figs. 5, 7; Table 1.

Diagnosis. *Aristolochia distorta* differs from its morphologically closest relatives *A. vaginans* and *A. marinae* by having a considerably larger limb relative to the tube and utricle (double to triple the size, vs. equal or smaller in *A. marinae* and *A. vaginans*), a distally strongly recurved limb that appears distorted and asymmetrical in front view (vs. only diminutively recurved at the limb's edges in *A. vaginans* and *A. marinae*), and a larger inclination angle of the limb (250–280° vs. 80–115° in *A. marinae* and 140–190° in *A. vaginans*). Furthermore, the petioles of *A. distorta* are two- to threefold longer than the peduncle plus ovary in anthetic flowers (vs. equal or shorter in *A. vaginans*).

Description. Perennial herb, procumbent shoots arising from subterranean, tuberous stem, internodes 4–7 cm long. Leaves alternate, broadly reniform, 3–5 × 2–3 cm, dark green, with pale green markings along the principal veins, more conspicuous on the abaxial surface, adaxial surface glabrous, abaxial surface tomentose, sinus 0.9–1.5 × 0.5–0.7 cm, main veins 5–7, leaf apex truncate to obtuse. Petioles sparsely hispid, 2.4–8.7 cm, pseudostipules

absent. Flowers solitary, borne from leaf axils of young shoots. Peduncle plus ovary puberulent, 1.0–3.4 cm, ovary 6-carpellate and 6-locular. Gynostemium hexandrous, ca. 4–7 mm. Perianth externally glabrous and green-purple, internally purple. Utricle ca. 0.8–1.1 × 0.5–1.0 cm. Tube short, cylindrical, ca. 0.9–1.5 × 0.3–0.6 cm, interior densely covered with friable, hispid trichomes. Limb 3.0–3.2 × 0.8–1.2 cm, supplied by 3–5 primary veins, glabrous, lateral, and apical margins strongly recurved in the anthetic flower leading to a distorted and asymmetrical front view, inclination angle 250–280°. Fruits capsular, six-chambered, cylindrical, ca. 2.8–5.1 × 1.4–2.1 cm. Seeds triangular-obovate, ca. 4–5 × 3–4 mm, thick, non-winged, abaxial surface with papillate warts, adaxial surface with a small elaiosome.

Additional Specimens Examined. **CHILE. Región IV [Coquimbo]. Choapa:** Estero Pupio, proximo a Campamento n°2 Tipay, El Romero, 555 m, 31°57'41"S, 71°05'37"W, 20 Sep 2024 (fl.), *D. Almendras 332* (CONC); ibid., 20 Sep 2024 (fl.), *D. Almendras 323* (EIF); Estero Pupio, sector Fundo Tipay, 556 m, 31°57'41"S, 71°05'37"W, 13 Sep 2023 (fl.), *D. Almendras s.n.* (JBN); porción superior de cuenca del estero Pupio, fundo Tipay-Romero, 575 m, 15 Oct 2011 (fl.), *L. Faúndez Y. & Carrasco s.n.* (CONC, SGO); ibid., Dec 2004 (fl.), *L. Faúndez Y.* et al. *s.n.* (CONC); Estero Pupio, 534 m, 31°57'32"S, 71°05'43"W, 12 Aug 2005 (fl., fr.), *G. Mieres U. s.n.* (JBN); Los Vilos, Estero Pupio, 31°57'32.3"S, 71°05'42.5"W, 8 Dec 2005 (fl., fr.), *G. Mieres U.* et al. *s.n.* (JBN); Barranco estero Pupio, 558 m, 31°57'41"S, 71°05'37"W, 26 Apr 2023 (fl.), *P. Novoa 1352* (JBN).

Distribution & Ecology. *Aristolochia distorta* is endemic to Coquimbo, Choapa province and has been found only at 500–600 m elevation in the Estero Pupio basin (Figs. 3B, 5). It is found in sclerophyllous arborescent shrubland dominated by *Vachellia caven* (Molina) Seigler & Ebinger, *Escallonia illinita* C.Presl (Escalloniaceae), and *Leucostele chiloensis* (Colla) Schlumpb.

Phenology. *Aristolochia distorta* flowers between August and December; fruits have been observed during the same period.

Etymology. The specific epithet is derived from Latin *distortus*, "deformed" or "twisted" and refers to the asymmetry of flowers at anthesis due to the extraordinarily wide opening angle, which is highly unusual among most known *Aristolochia* species (Fig. 7E).

Preliminary Assessment of Extinction Threat. Because we are awaiting additional data before conducting a full assessment of *Aristolochia distorta*, we retain the Red List category of NE (not evaluated). The surrounding areas of the two known populations have been only briefly surveyed, and although there is no evidence of recent decline in occurrence or habitat extent, survey effort remains limited. Mining activity and change in land use are major threats to the conservation of the species, but these are not known to occur within protected habitats. The currently known distribution is extremely small, suggesting a potential status of Critically Endangered, but additional subpopulations may exist within the same or adjacent gorges.

5. ***Aristolochia juntucha*** D. Frank & D. Almendras, **sp. nov.** TYPE: [Chile:] Nameless road behind Cerro El Calvario, close to D-51, Andacollo, 30°13'12.9"S, 71°05'10.0"W, 1,097 m, 5 Dec 2022 (fl., fr.), *D. Almendras s.n.* (holotype: SGO, barcode 171816 [!]; isotypes: JBN, barcode 4904 [!]; VALPL, barcode 3002 [!]; CONC, barcode CONC 201601 [!]; UV [!]). Figs. 5, 8, Table 1.

Diagnosis. *Aristolochia juntucha* differs from its morphologically closest relatives *A. vaginans* and *A. pearcei* by its smaller perianth size (3–4 cm vs. 4–7 cm in *A. pearcei* and 5–9.5 cm in *A. vaginans*), glabrous, warty internal limb surface (vs. with dense hispid trichomes in *A. vaginans* and *A. pearcei*), narrower transition from limb to tube in anthetic flowers (vs. large, circular opening in *A. vaginans* and *A. pearcei*), and by the ratio of petiole length to the peduncle plus ovary length (petioles 1.5 to 3 times longer than the peduncle plus ovary in anthetic flowers vs. equal or shorter in *A. vaginans* and *A. pearcei*). From *A. pearcei* it also differs by a larger inclination angle of the limb (150–190° vs. 75–120° in *A. pearcei*), and from *A. vaginans* it differs by tube and utricle measurements (the utricle 0.5–0.9 × 0.3–0.8 cm and the tube 0.7–1.6 × 0.3–0.6 cm vs. the utricle 0.9–3.4 × 0.8–2.9 cm and the tube 1.6–4.5 × 0.8–2.5 cm in *A. vaginans*).

Description. Perennial herb, procumbent shoots arising from a xylopodium, internodes 3–7 cm long. Leaves alternate, reniform, 3–8 × 1–4 cm, dull green, with light markings along the main veins, reddish when young, adaxial surface sparsely puberulent, abaxial surface puberulent, sinus 0.7–1.2 × 0.4–0.6 cm, main veins 5–7, leaf apex truncate to retuse. Petioles sparsely puberulent, 2.0–7.0 cm, pseudostipules absent. Flowers solitary from leaf axils of young shoots. Peduncle plus ovary puberulent, 0.9–1.7 cm, ovary 6-carpellate and 6-locular. Gynostemium hexandrous, ca. 2–4 mm. Perianth externally glabrous and green-yellow, internally bright yellow. Utricle ca. 0.5–0.9 × 0.3–0.8 cm. Tube cylindrical with a small adaxial bulge anterior to the limb, ca. 0.7–1.6 × 0.2–0.4 cm, interior covered densely with friable, hispid trichomes. Limb 1.7–2.7 × 0.6–0.9 cm, supplied by 3–5 primary veins, lateral margins recurved in the anthetic flower, opening forming a narrow groove, trichomes absent, internal surface covered in flat irregular warts, inclination

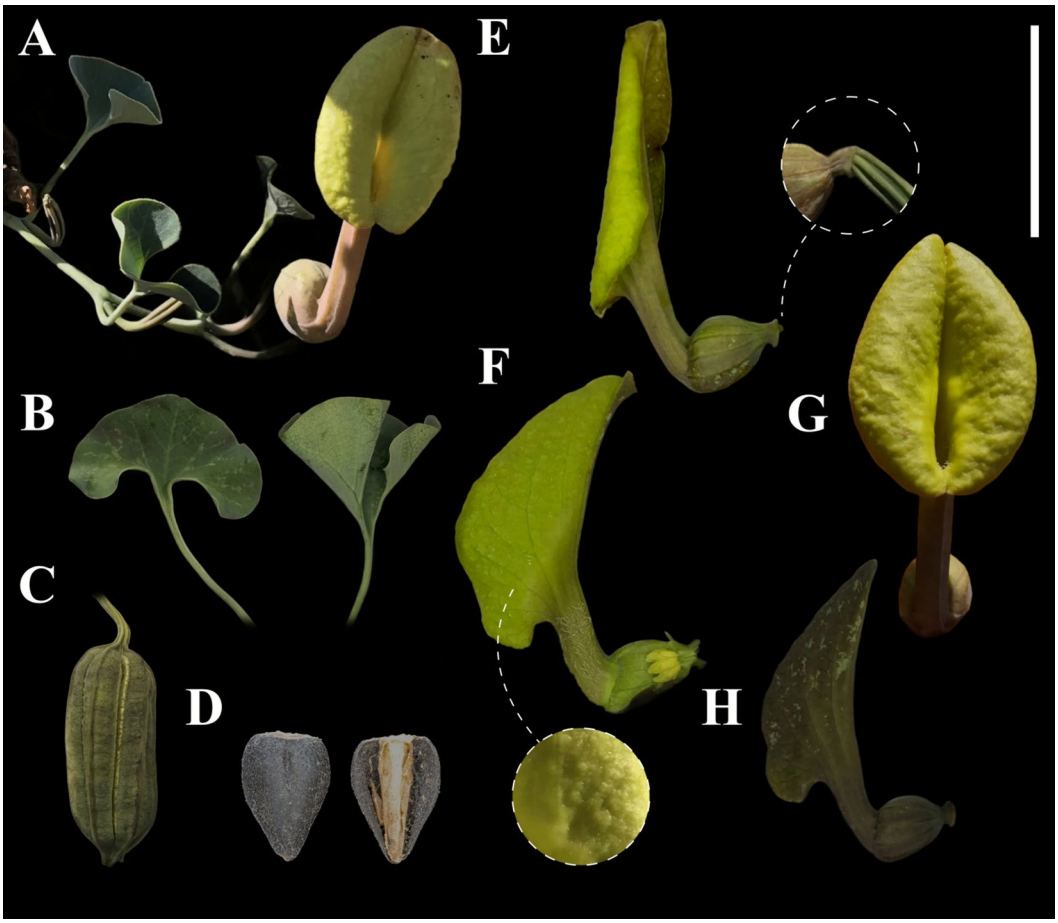

Fig. 8. Aristolochia juntucha. **A.** Habit. **B.** Leaves. **C.** Fruit. **D.** Seed. **–G.** Anthetic flower, in lateral view (E), in longitudinal section (F), and in frontal view (G). Note the papillate warts on the limb (F). **H.** Pre-anthetic flower. [Scale bars: A, 3 cm; B, 5 cm; C, 3 cm; D, 1 cm; E–H, 2.5 cm. Photos (all reproduced with permission): A–C and E–H, by Diego Almendras from the type gathering; D, by Marco Ebert from the type gathering].

angle 150–190°. Fruits capsular, six-chambered, cylindrical, ca. 2.5–3.6 × 1.3–1.6 cm. Seeds triangular, approximately 4–5 × 3–4 mm, thick, non-winged, abaxial surface granular, adaxial surface with small elaiosome present.

Additional Specimens Examined. **CHILE. Región IV [Coquimbo]. Elqui:** by the D-51, 1.5 km from point 1, Andacollo, 1,019 m, 30°12'36"S, 71°05'35.4"W, 5 Dec 2022 (fl., fr.), *D. Almendras s.n.* (SGO); Cerro Antena, ladera norte, Andacollo, 1,178 m, 30°13'12"S, 71°05'13"W, 11 Sep 2024 (fl.), *D. Almendras 330* (CONC); ibid., 11 Sep 2024 (fl.), *D. Almendras 347* (EIF); Andacollo Valley, 3000 ft, 9 Oct 1927 (fl., fr.), *C. Elliot 87* (E); Andacollo, 5 km al sur, 1,100–1,200 m, 30°15'S, 71°06'W, 1–6 Apr 2008 (fl.), *M. Mihoc 387* (CONC); 70 km de Los Vilos (Dto Illapel), 350 m, 18 Sep 1952 (fl.), *M. Ricardi 2034* (CONC); Andacollo, 1,000 m, 30°14'S, 71°05'W, 11 Oct 1958 (fl.), *M. Ricardi* et al. *4932/1317* (CONC).

Distribution & Ecology. *Aristolochia juntucha* is endemic to Coquimbo, Elqui province and has only been found on the Andacollo Plateau, where it occurs on north-facing hill slopes at 900–1,200 m elevation. It is found in thorny shrubs in the Chilean Mediterranean Interior Semi-Desert Scrub and Grassland (Luebert & Pliscoff, 2022), dominated by *Leucostele chiloensis* (Colla) Schlumpb. and *Eulychnia acida* Phil. (both Cactaceae), *Calliandra chilensis* Benth. (Fabaceae), *Bridgesia incisifolia* Bert. ex Cambess. (Sapindaceae), *Proustia cuneifolia* D.Don (Asteraceae), and *Gymnophyton robustum* Clos (Apiaceae).

Phenology. *Aristolochia juntucha* flowers between September and December with occasional flower reports in April. Fruits have been observed from October to December.

Ethnobotany. Locally known as *oreja de zorra*, meaning "vixen's ear", the plant is mentioned by locals as being used to counteract dermatitis, applied as an external ointment.

Etymology. The specific epithet *juntucha* is derived from Quechua, the language of the Inka people, and translates to "unity", symbolizing the team effort that led to its discovery.

Preliminary Assessment of Extinction Threat. *Aristolochia juntucha* is known from only eight occurrence points, representing two extant locations. We propose a classification of CR (critically endangered) [B1ab(i,ii,iii) + 2ab(i,ii,iii)]. The original EOO was approximately 3.3 km^2 and the AOO 12 km^2, both already below the thresholds for CR (IUCN 2024). Current surveys suggest reductions to an EOO of ~ 0.032 km^2 and an AOO of ~ 4 km^2, reflecting the extremely limited and clustered distribution of known points. These reductions are inferred only for subcriterion b (continuing decline in habitat quality and extent) and do not affect the thresholds used for classification. We therefore prioritize the AOO as a more reliable metric in this assessment, as the EOO is poorly suited for species with extremely restricted and fragmented distributions (IUCN 2024). The remaining populations are confined to two locations facing an ongoing, extreme threat from large-scale mining activity, which has caused habitat loss for a now extinct subpopulation south of Andacollo (*M. Mihoc 387*). Although *A. juntucha* is still abundant on this single plateau, the populations are in dire danger of decline because the habitat is not protected. These factors meet the subcriteria of continuing decline in habitat quality and extent (ab (i,ii,iii)) under both B1 and B2.

Remarks. This species has previously been confused with *Aristolochia pearcei*, under the name *A. bridgesii* (Ruiz, 2001). While the transition from limb to tube forms a narrow groove in the anthetic flower of *A. juntucha* (Fig. 8G), it constitutes a comparably large and circular opening in both *A. pearcei* (Fig. 6) and *A. vaginans* (Fig. 4).

6. ***Aristolochia marinae*** D. Almendras & D. Frank, **sp. nov.** TYPE: [Chile:] Coquimbo, Choapa, Salamanca, by the D-845, in a gorge between San Agustín and Zapallar, 31°43'18.1"S, 70°48'55.7"W, 1,065 m, 27 Oct 2022 (fl., fr.), *D. Almendras s.n.* (holotype: SGO, barcode 171805 [!]; isotypes: JBN, barcode 4905 [!]; VALPL, barcode 3003 [!]; UV [!]). Figs. 5, 9; Table 1.

Diagnosis. *Aristolochia marinae* differs from its morphologically closest relatives *A. vaginans* and *A. pearcei* by the relative lengths of the petiole and the peduncle plus ovary in anthetic flowers (petioles equal to or longer than the peduncle plus ovary in *A. marinae* vs. equal to or shorter than in *A. vaginans* and *A. pearcei*), the internal limb surface with short, reduced trichomes (vs. dense hispid trichomes in *A. vaginans* and *A. pearcei*), the limb's opening widely gaping and inflated (vs. circular to ellipsoid in *A. vaginans* and *A. pearcei*), the tube broadly infundibuliform (vs. cylindrical in *A. vaginans* and *A. pearcei*), and the inclination angle of the limb 80–115° (vs. 140–190° in *A. vaginans*).

Description. Perennial herb, procumbent shoots arising from a xylopodium, internodes 4–12 cm long. Leaves alternate, broadly reniform, 3–6 × 2–3 cm, dull green, with light markings along the main veins, both surfaces puberulent, sinus 1.1–2.7 × 0.4–0.7 cm, main veins 5–7, leaf apex truncate to obtuse. Petioles puberulent, 1.2–3.7 cm, pseudostipules absent. Flowers solitary, borne from leaf axils of young shoots. Peduncle plus ovary puberulent, 1.0–3.2 cm, ovary 6-carpellate and 6-locular. Gynostemium hexandrous, ca. 4–8 mm. Perianth externally glabrous and green-purple, internally purple. Utricle ca. 1.0–1.5 × 0.8–1.4 cm. Tube broadly infundibuliform with a small adaxial bulge anterior to the limb, ca. 1.6–3.1 × 0.4–0.8 cm, interior covered with friable, hispid trichomes. Limb supplied by 3–5 primary veins, sparsely covered by short trichomes, lateral and apical margins recurved in the anthetic flower, opening widely infundibuliform, inclination angle 80–115°. Fruits capsular, six-chambered, cylindrical, ca. 2.1–3.2 × 0.9–1.1 cm. Seeds triangular-obovate, ca. 4–5 × 3–5 mm, thick, non-winged, abaxial surface granular, adaxial surface with a small elaiosome present.

Additional Specimens Examined. **CHILE. Región IV [Coquimbo]. Choapa:** Ruta D-845, Zapallar, 1,170 m, 31°42'10"S, 70°46'57"W, 20 Sep 2024 (fl.), *D. Almendras 331* (CONC); ibid., 20 Sep 2024 (fl.), *D. Almendras 322* (EIF); Rio Chalinga, sector Zapallar, Salamanca, 1,189 m, 11 Aug 2017 (fl.), *O. Fernández 837* (JBN); Estero Chalinga, San Agustín, 1,131 m, 31°42'7"S, 70°47'18"W, 12 Mar 2005 (fl.), *G. Mieres U. s.n.* (JBN); ibid., 31°42'6.5"S, 70°47'17.7"W, 3 Dec 2005 (fl., fr.), *G. Mieres U.* et al. *s.n.* (JBN).

Distribution & Ecology. *Aristolochia marinae* is endemic to Coquimbo, Choapa province and has only been found in the high Chalinga River basin, where it occurs at 1,000–1,200 m elevation (Figs. 3B, 5). It is found in Mediterranean Andean Cool Semi-desert Scrub and Grassland (Luebert & Pliscoff, 2022), in vegetation dominated by *Leucostele chiloensis* (Colla) Schlumpb., *Colliguaja odorifera* Molina, *Spinoliva ilicifolia* (Hook. & Arn.) G.Sancho (Asteraceae), *Neltuma chilensis* (Molina) C.E.Hughes & G.P.Lewis and *Vachellia caven* (Molina) Seigler & Ebinger (both Fabaceae), and *Puya alpestris* Gay (Bromeliaceae).

Phenology. *Aristolochia marinae* flowers between October and December. Fruits have been observed during the same period.

Etymology. The specific epithet *marinae* honors Marina Santana Reyes, grandmother of the second author, in recognition of her support for his intellectual and professional development.

Preliminary Assessment of Extinction Threat. *Aristolochia marinae* is a stenoendemic species currently known from six occurrence records distributed along a linear high-elevation corridor. Its AOO is 12.0 km^2. Following IUCN guidelines (2024, Sect. 4.9), the EOO is set equal to the AOO (12.0

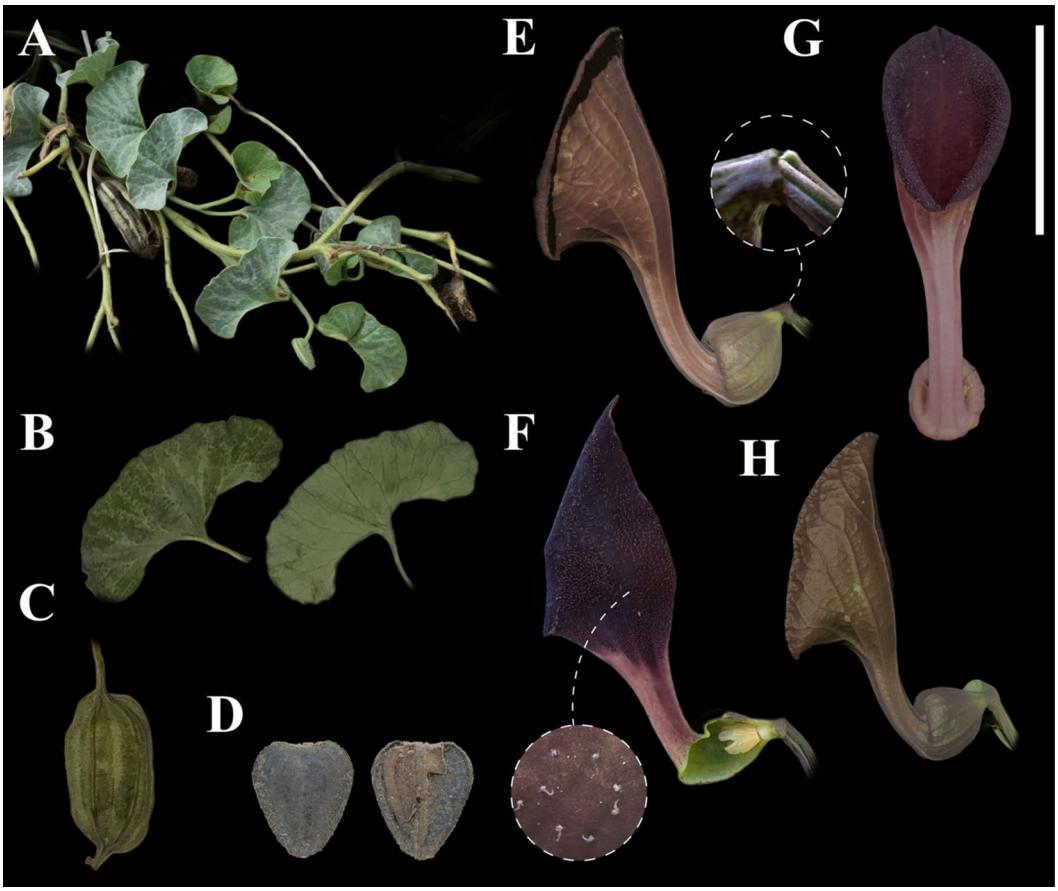

Fig. 9. *Aristolochia marinae*. **A.** Habit. **B.** Leaves. **C.** Fruit. **D.** Seed. **E–G.** Anthetic flower, in lateral view (E), in longitudinal section (F), and in frontal view (G). Note the short, sparsely distributed trichomes on the interior of the limb (F). **H.** Pre-anthetic flower. [Scale bars: A, 8 cm; B, 5 cm; C, 2.5 cm; D, 1 cm; E–H, 4.5 cm. Photos (all reproduced with permission): A–C and E–H, by Diego Almendras from the type gathering; D, by Marco Ebert from the type gathering].

km^2) given the small number and close clustering of records. All populations lie outside protected areas and face multiple ongoing threats, including road expansion, slope instability, development pressure, and livestock browsing by free-roaming goats and cattle. These pressures are likely to drive continuing declines in the quality of habitat, and possibly the number of subpopulations. Based on its restricted AOO, occurrence in no more than two threat-defined locations, and evidence of continuing decline, *A. marinae* qualifies as EN (endangered) [EN B2ab (ii,iii,iv)] (see IUCN, 2012, 2013, 2024).

Remarks. We hypothesize that *Aristolochia marinae* and *A. distorta* are stenoendemic species occupying in part the niche of *A. vaginans*, which is absent in higher elevation areas of the Choapa region (see Fig. 5).

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Declarations

Competing interests

The authors are unaware of any conflicts of interest.

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